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Chapter 2

Alternatives Considered

2.1 INTRODUCTION

This chapter describes the reasonable alternatives considered to meet the Need and Purpose for the project as well as those that were dismissed from further consideration. The discussion provides an overview of the various alternatives considered during the alternatives analysis phase of the study and the process by which reasonable alternatives were identified for analysis in the Draft Environmental Impact Statement (EIS). The second part of this chapter defines the alternatives considered for implementation and analyzed in detail as part of the Draft EIS.

2.1.1 Description of Existing Facility

The United States (US) Highway 281 Corridor Project extends approximately eight miles from Loop 1604 on the south to Borgfeld Drive on the north. The existing project corridor is composed of several typical roadway sections (**Figure 2-1**). These include the freeway section from Loop 1604 to 0.2 miles north of Sonterra Boulevard; the recently completed US 281 Super Street from Redland Road to 0.25 miles north of Marshall Road, (**Figure 2-2**) which encompasses US 281 intersections with Encino Rio, Evans Road, Stone Oak Parkway, and Marshall Road; and from 0.25 miles north of Marshall Road to Borgfeld Drive.

Within the project limits, US 281 is classified by the Texas Department of Transportation (TxDOT) as an Urban Principal Arterial roadway from approximately Loop 1604 to Stone Oak Parkway and a Rural Minor Arterial roadway from approximately Stone Oak Parkway to Borgfeld Drive (TxDOT 2009e). Approximately one-half mile of the US 281 project corridor is access-controlled, between Loop 1604 and Sonterra Boulevard; the rest of the project corridor is directly accessible via cross streets and driveways. The US 281 project corridor is a designated hazardous cargo route.

In 2010 the highest daily traffic volumes within the US 281 project corridor were in the southern section, north of Loop 1604. Daily traffic volumes in the northern section, in the vicinity of Borgfeld Drive, were only about one-fourth those of the southern section (**Table 2-1**).

Federal Regulatory Context

An Environmental Impact Statement (EIS) will rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.

Source: Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, Code of Federal Regulations, Title 40: Part 1502.14

Definitions:

Urban Principal Arterial: is “unusually significant to the area” and serves to carry the highest volumes of trips entering or leaving an urban area. As such, access to adjacent properties “should be subordinate to” through-traffic.

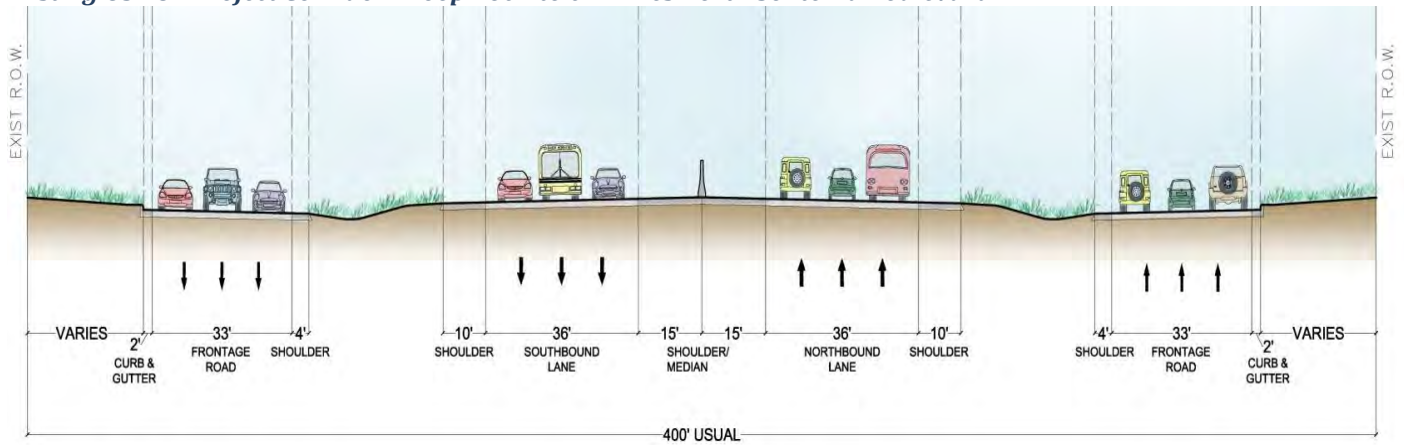
Rural Minor Arterial: a link between rural cities and towns which should “provide relatively high speeds with minimum interference to through movement.”

Source: FHWA, 1989

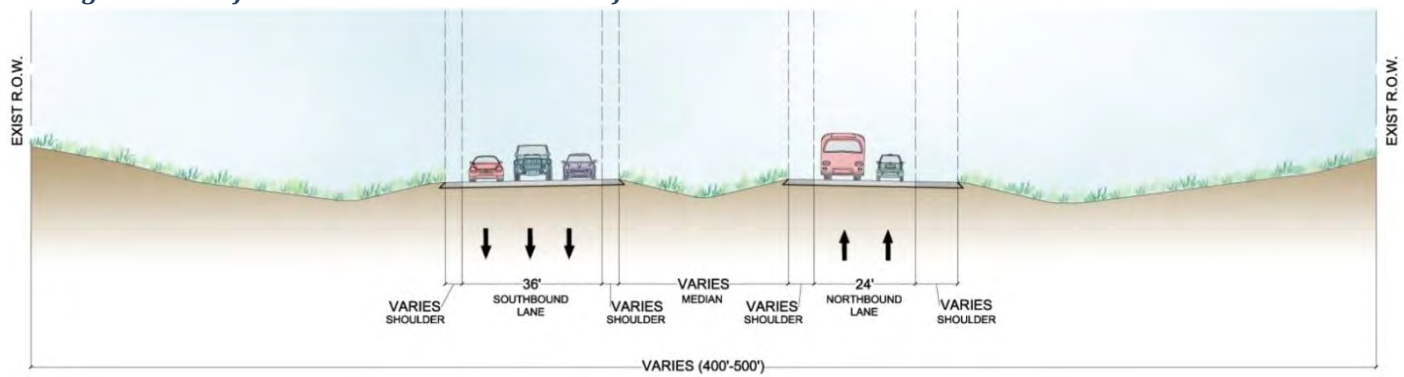


1 **Figure 2-1: Typical sections, US 281 project corridor**

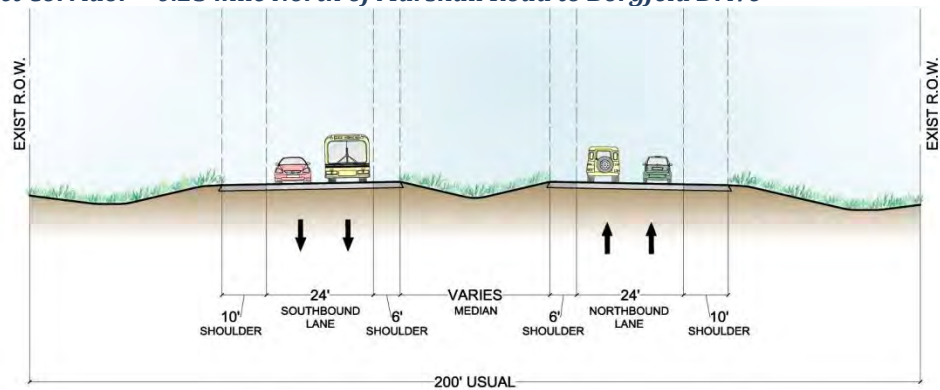
2 **Existing US 281 Project Corridor - Loop 1604 to 0.2 miles North Sonterra Boulevard**



4 **Existing US 281 Project Corridor - 0.2 miles North of Sonterra Boulevard to Redland Road**



6 **Existing US 281 Project Corridor - 0.25 mile North of Marshall Road to Borgfeld Drive**



Source: US 281 EIS Team, 2012



1 **Figure 2-2: Aerial of US 281 Super Street at Evans Road**



2
3 Source: Microsoft, Bing Maps, 2011

1 **Table 2-1: 2010 Average Daily Traffic for US 281 Project Corridor**

Location	Average Daily Traffic (vehicles per day)
Northern Segment (0.5 miles North of Borgfeld Drive)	
US 281 Project Corridor	30,000
Southern Segment (0.3 miles North of Loop 1604)	
US 281 Project Corridor	133,000

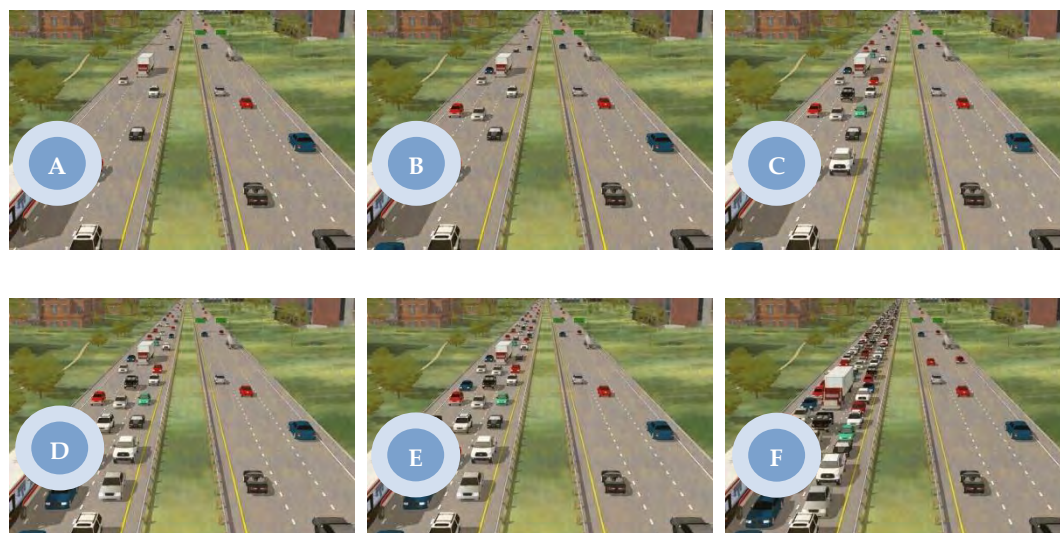
2 Source: TxDOT Statewide Planning Maps, 2010

3 **Table 2-2** shows traffic Levels of Service (LOS) for the US 281 project corridor in 2008,
4 the base year for the Metropolitan Planning Organization (MPO) travel demand model.
5 LOS is defined as a measurement on a scale from A (the best) to F (the worst), which
6 characterizes the flow of traffic (free flow to stop and go) as well as a driver's perception
7 of how easy it is to change lanes (Transportation Research Board). **Figure 2-3** illustrates
8 the six levels of service. The worst peak period traffic conditions occur in the morning
9 southbound direction and evening northbound direction.

10 **Table 2-2: US 281 Project Corridor Traffic Levels of Service**

US 281 Project Corridor Location	Morning Peak Period		Evening Peak Period	
	Northbound	Southbound	Northbound	Southbound
Marshall Road to Wilderness Oaks	A/B	D	D	C
Redland Road to Encino Rio	C	F	E	D

11 Source: SA-BC MPO Travel Demand Model 2010; US 281 EIS Team, 2011

12 **Figure 2-3: Levels of service**

13 Source: US 281 EIS Team, 2010.



2.2 DEVELOPMENT OF ALTERNATIVES

The following section provides an overview of the preliminary alternatives identified through public and agency involvement activities.

2.2.1 Community and Public Agency Involvement

The identification and evaluation of alternatives was informed through active and continuous community and public agency involvement. During the alternatives analysis phase of the US 281 EIS process, from the summer of 2009 through the summer of 2011, members of the public participated in three public meetings to consider and discuss project alternatives. During this time the US 281 EIS Community Advisory Committee (CAC) met six times, and the US 281 EIS Peer Technical Review Committee (PTRC) met four times. Throughout the process participants were engaged in the definition of the project's Need and Purpose and the identification and evaluation of alternatives.

The alternatives analysis process for US 281 was conducted in conformance with Section 6002 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which allows federal, state, local, and tribal agencies to have a formal role in the process. Throughout the project scoping process, the Federal Highway Administration (FHWA), Texas Department of Transportation (TxDOT) and the Alamo Regional Mobility Authority (RMA) collaborated with and considered the input of other agencies in the definition of the Need and Purpose, the range of alternatives to be evaluated, and the determination of the methodologies to be used and the level of detail required in the analysis of alternatives.

Formal concurrence on the alternatives development process was coordinated between the joint lead agencies. More information about the public meetings, CAC, PTRC and scoping concurrence is provided in **Chapter 6 Agency Coordination and Public Involvement**.

2.2.2 Preliminary Range of Alternatives

The preliminary range of alternatives represented a variety of transportation solutions aimed at meeting the purpose of US 281 corridor improvements, which is to improve mobility and accessibility, improve safety, and enhance community quality of life. The preliminary alternatives were refined based on coordination with the public, the CAC, the PTRC, and cooperating and participating agencies. The following sections provide a brief overview of the preliminary range of alternatives, which included modal, alignment and design alternatives, as well as a no-action alternative. (See **Section 2.4.1** for a description of the No-Build Alternative.)

Fixed Guideway Transit

Fixed guideway transit systems require the construction of a permanent track on which the transit vehicles travel. Fixed guideway transit systems considered in the preliminary range of alternatives included heavy rail, commuter rail, monorail, automated guideway transit, personal rapid transit, light rail, and streetcar.

Community and public agency committees involved in the alternatives development process:

- The US 281 EIS **Community Advisory Committee (CAC)** is made up of citizens and interest group representatives. Member organizations were invited by the Alamo RMA Board of Directors to serve as a voice for issues that arise in the broader community. The CAC also serves as a resource to assist in identifying public involvement activities and provide support for those efforts in the community.
- The US 281 EIS **Peer Technical Review Committee (PTRC)** is chaired by the Federal Highway Administration and is composed of technical experts from federal, state and local public agencies. The PTRC reviews technical aspects of the project, including both transportation and environmental issues, and provides advice to FHWA, the joint lead agencies and the US 281 EIS Team.

Example of light rail:
Metro, Houston, Texas





Non-Guideway Transit

Non-guideway transit is generally more flexible and easily implemented as compared to the fixed guideway transit alternatives because a permanent track is not required and the service and routes can be adjusted based on need. Bus service is the most common type of non-guideway public transit. It provides higher flexibility with low capital costs and has the ability to serve a variety of travel markets. It typically operates in mixed traffic on roadways and can be powered by electric, carbon fuel, or hybrid technology. Bus rapid transit (BRT) is a modernized bus service that generally operates in preferential or exclusive bus lanes. BRT is characterized by technological and design enhancements that allow for signal prioritization, improved fare collection, easier boarding, and advanced passenger information technology.

Example of BRT:
Transitway, Ottawa, Canada



Highway

Highway alternatives involve the creation of a new roadway parallel to the US 281 project corridor, the expansion of existing parallel roadways, and design changes to the US 281 project corridor itself.

New Parallel Corridor

The new parallel corridor alternative considered developing a completely new roadway on the east or west side of US 281.

Blanco Road, 2010 (San Antonio, Texas)



Expansion of Existing Parallel Roadways (Widen Blanco Road & Bulverde Road)

North-south roadways parallel to the US 281 project corridor include Blanco Road to the west and Bulverde Road to the east. In 2011, both Blanco Road and Bulverde Road are two- to four-lane roadways. This alternative would expand these parallel corridors to six-lane divided facilities.

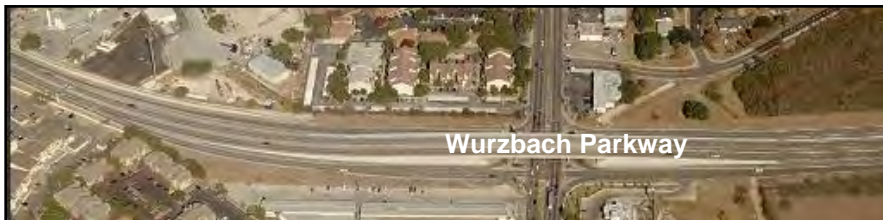
Bulverde Road, 2010 (San Antonio, Texas)



Grade-Separated Intersections (Overpasses)

This alternative would create grade separations (or overpasses) at major intersections along US 281 from Loop 1604 to Borgfeld Drive. This alternative did not include frontage roads, so access to adjacent properties would have to occur at ramps and mid-block driveways. An example of a grade separated intersection is Wurzbach Parkway at Perrin Beitel Road in San Antonio.

Wurzbach Parkway at Perrin Beitel Road, San Antonio, Texas





Add Lanes (No Overpasses)

This alternative would make the US 281 project corridor a six-lane divided highway by providing an additional northbound lane from Evans Road to Stone Oak Parkway, and an additional lane in each direction from Stone Oak Parkway to Borgfeld Drive. This alternative would not include overpasses or grade separations.

Expressway

The Expressway Alternative would create main lanes and frontage roads. The main lanes would be access-controlled with on and off ramps at key locations. Overpasses would be built at major intersections and frontage roads would allow access to adjacent property. This alternative could be similar to US 281 south of Loop 1604, or elevated, like the Lee Roy Selmon Crosstown Expressway in Florida.

US 281 at Donella Drive (San Antonio, Texas)



Lee Roy Selmon Crosstown Expressway (Tampa, Florida)



Other Alternatives

Additional alternatives were identified in the *Mobility 2035* among the long range planning strategies aimed at congestion management in corridors such as the US 281 project corridor.

High Occupancy Vehicle (HOV)/ High Occupancy Toll (HOT) Lanes

HOV/HOT Lanes are operational improvements that can be applied to any of the above new capacity highway alternatives. HOV lanes are designated lanes for the exclusive use of HOVs, usually personal vehicles carrying two or three-plus passengers, motorcycles and buses. Future policy decisions would determine the number of passengers required to be considered a HOV and/or what time of day HOV lanes would be active. HOT lanes are designated toll lanes that can be used by any driver for a fee. A future policy decision would be needed to set a pricing structure for this option.

Growth Management

Growth management refers to local and/or regional policy initiatives that are intended to manage growth in the metropolitan area. *Mobility 2035* has adopted a land use scenario that promotes Transit Oriented Development and Infill Development in the San Antonio area as a growth management strategy. As part of the infill strategy, this scenario would limit growth outside of Loop 1604 in Bexar County and encourage more efficient land uses that reduce trip lengths.



Transportation System Management (TSM)

TSM refers to easily implementable, low capital cost transportation improvements that increase the efficiency of transportation facilities and services. The US 281 Super Street is an extreme example of TSM. Other examples include improved signal management, access management, ridesharing, and incident management programs.

Transportation Demand Management (TDM)

TDM typically refers to policies and programs that are directed towards reducing single occupant vehicle travel. Some examples of TDM include area pricing, alternative work schedules, and parking management.

Bike and Pedestrian Facilities

Bike and pedestrian facilities provide an alternative transportation mode (especially for short distance travel), in context with other transportation facilities, they serve as a means to help foster efficient inter-modal connectivity. Bike and pedestrian facilities could include sidewalks, shared or designated bike lanes, and street furniture such as benches or bike racks.

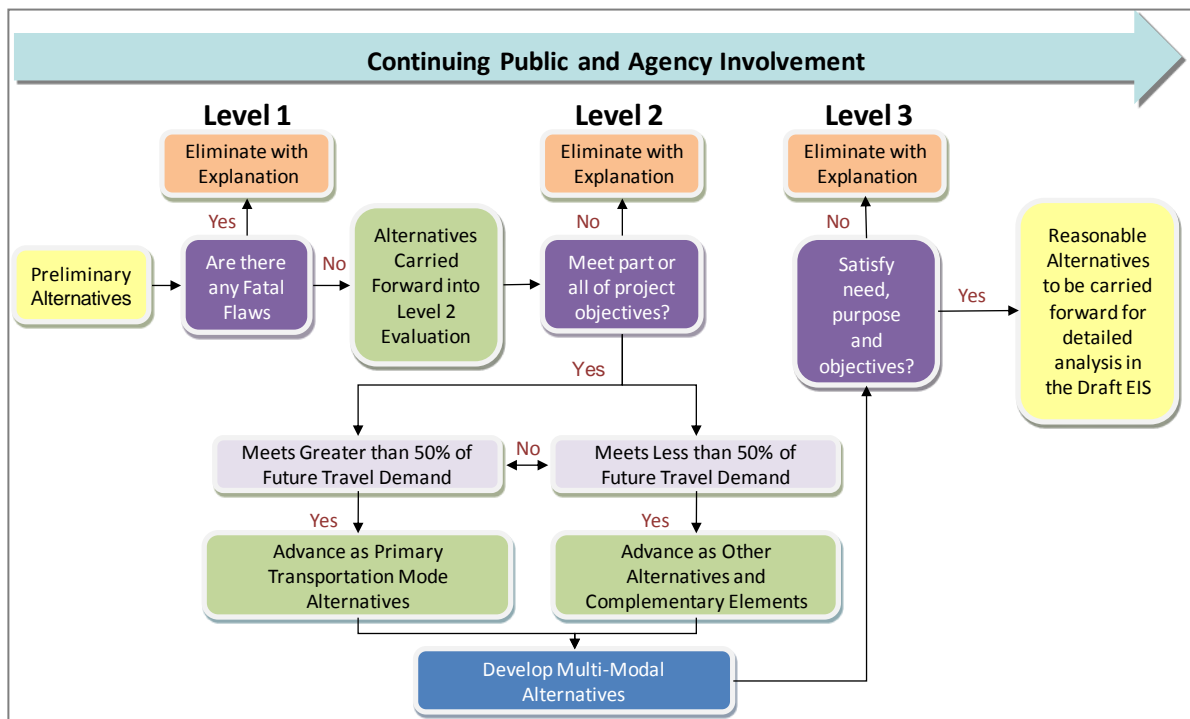
2.3 ALTERNATIVES EVALUATION

2.3.1 Alternatives Evaluation Process

The preliminary range of alternatives was evaluated through a three-level screening process. Level 1 evaluation was a “fatal flaw” analysis of all of the preliminary alternatives using qualitative criteria, and eliminated alternatives that did not meet them. The remaining alternatives were carried forward to Level 2. Level 2 evaluation involved a more detailed modal analysis based on a series of decision points that resulted in an alternative either being eliminated or categorized as a primary alternative, other alternative or complementary element. Primary and other alternatives were packaged to form multi-modal alternatives for Level 3 evaluation. Using the project’s Need and Purpose and the identified objectives, Level 3 screening applied detailed quantitative and qualitative criteria to compare each alternative to the others, including the No-Build Alternative. Following Level 3 screening alternatives were either eliminated or advanced in combination with the complementary elements for detailed analysis in the Draft EIS. An overview of the evaluation process is shown in **Figure 2-4** and a more detailed review of each level of evaluation follows below.



Figure 2-4: Overview of alternatives evaluation process



Source: US 281 EIS Team, 2010

The evaluation process relied extensively on the San Antonio-Bexar County Metropolitan Planning Organization (SA-BC MPO) travel demand model, developed for use in the preparation of *Mobility 2035* during 2009. The model was used in the US 281 EIS alternatives analysis to forecast future traffic volumes and analyze other measures of effectiveness (MOEs) for the alternatives under evaluation. When the SA-BC MPO released a new travel demand model in June 2010, traffic forecasts and MOEs used in the evaluation of project alternatives were updated. See **Appendix D** for a more detailed description of how the SA-BC MPO's travel demand model was used as part of the alternatives evaluation process and how it is used in the Draft EIS.

2.3.2 Level 1 Alternatives Evaluation Process and Results

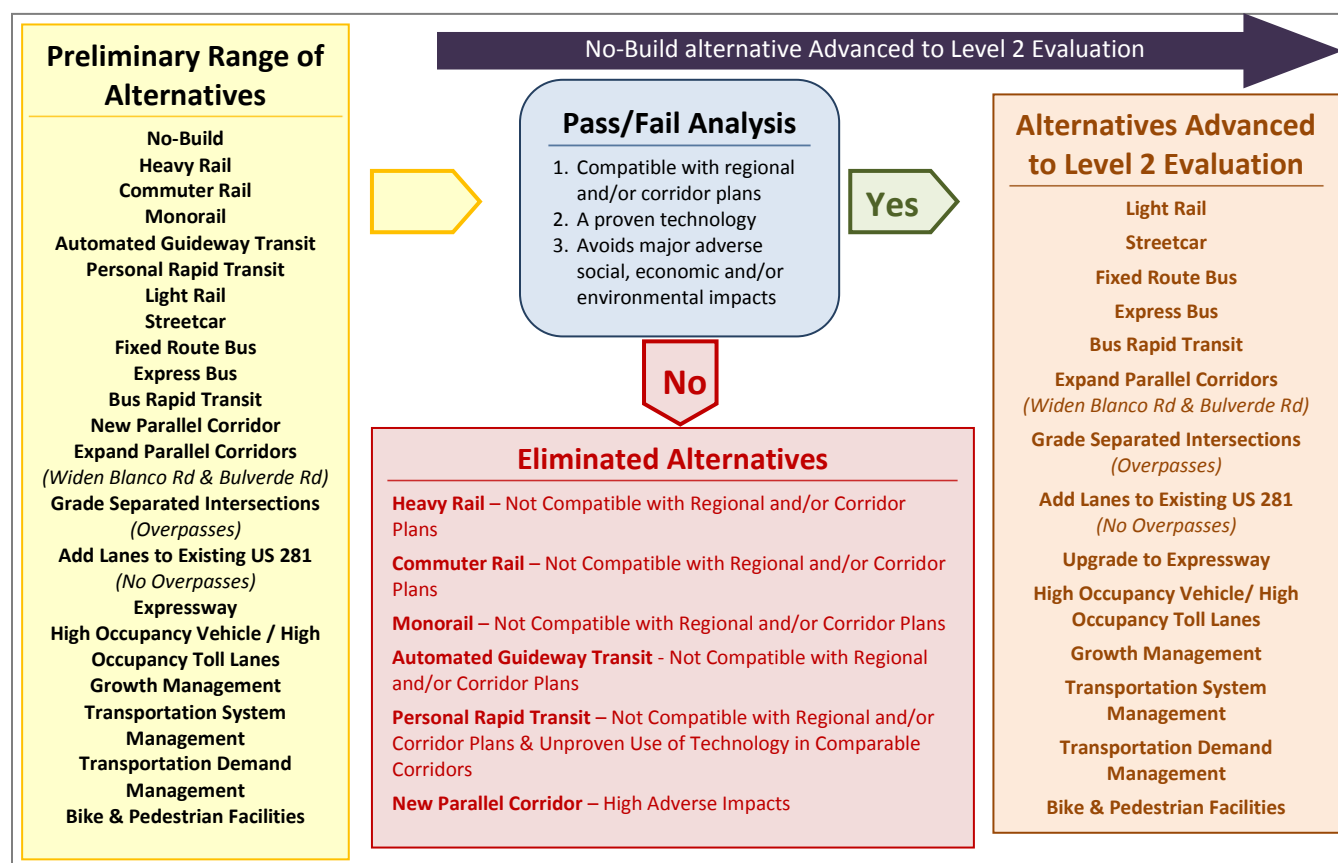
Level 1 evaluation used a "fatal flaw", qualitative analysis method that resulted in a pass/fail decision for each of the Level 1 alternatives. The criteria for this level of analysis, grounded in the project's need, purpose and objectives, are as follows:

- Is the alternative compatible with regional and/or corridor plans? This addressed the planned growth in the region and ensured that alternatives fit into the future vision for the corridor, such as *Mobility 2035* and VIA Metropolitan Transit's (VIA) *Draft Comprehensive Long Range Plan*.
- Is this a proven technology? This spoke to the functionality of the alternative for the US 281 project corridor by ensuring that it had been successfully implemented in other corridors similar to US 281.
- Would the alternative avoid major adverse social, economic and/or environmental impacts? This encompassed several project objectives aimed at protecting a variety of resources in the natural and human environment.



Alternatives that did not meet all three Level 1 criteria were recommended for elimination. Those alternatives satisfying the three criteria were advanced to Level 2 evaluation, along with the No-Build Alternative. **Figure 2-5** illustrates the Level 1 evaluation process and the results of the fatal flaw analysis.

Figure 2-5: Level 1 evaluation process and results



Source: US 281 EIS Team, 2010

Alternatives Eliminated

Five transit alternatives and one highway alternative were eliminated as a result of the Level 1 analysis. The five transit alternatives included heavy rail, commuter rail, monorail, Automated Guideway Transit (AGT), and Personal Rapid Transit (PRT). These transit alternatives were removed from further consideration because they were not compatible with regional and/or corridor plans. VIA's Comprehensive Long Range Plan, adopted in July 2011, responds to local and regional growth patterns and reflects a citizen-driven transit vision of the future. This plan guides regional investments, concentrates resources to reach the greatest number of people, and outlines both a strong bus improvement plan and a network of integrated high capacity transit corridors with a range of transit mode alternatives. None of the five transit alternatives for the US 281 Corridor Project are included in this plan; nor are they included in *Mobility 2035*. No other transportation agencies (local, regional, state or federal) are contemplating these transit alternatives for the US 281 project corridor. In addition, PRT was eliminated because it did not have a proven track record for implementation in a context similar to the US 281 project corridor. The main application areas of PRT are typically airports, tourist attractions, shopping parks and malls, university and hospital



campuses, and industrial business parks. PRT is typically not deployed in a linear, radial, suburban corridor such as the US 281 project corridor. During the course of the alternatives analysis process, the Alamo RMA and VIA formed a staff working group to coordinate transportation planning in the US 281 project corridor. The working group was an effective means for the consideration of transit alternatives in the context of VIA's long range planning activities.

Among the highway alternatives, the new parallel corridor alternative was eliminated because the area on both sides of the US 281 project corridor is already developed with residential and commercial land uses. A new parallel corridor to the east or west of US 281 would potentially have high adverse social, economic and environmental impacts.

2.3.3 Level 2 Alternatives Evaluation Process and Results

The alternatives advanced to Level 2 were assessed using four decision points (**Figure 2-6**). The first decision point was a pass/fail decision-making stage consisting of three criteria derived from the project's need, purpose and objectives:

Decision Point 1:

- Does the alternative reduce conflict between local and through traffic? The question addresses the functionality of the US 281 project corridor.
- Would the alternative improve system connectivity? This spoke to the alternative's ability to connect with the transportation system planned for the corridor and region.
- Can the alternative reduce crash rates? This emphasized the project's need to improve safety.

Alternatives that could not meet all of the above criteria were recommended for elimination. Alternatives passing Decision Point 1 were then evaluated against the next three decision points that specifically explored how well each alternative could satisfy the forecasted 2035 travel demand. The three decision points were used to categorize alternatives as a Primary Alternative, Other Alternative, or Complementary Element for Level 3 evaluation. Complementary Elements are long term congestion management strategies that could be combined with Primary or Other alternatives to help in meeting the project's need, purpose and objectives.

Decision Point 2:

- Can the alternative satisfy at least 50 percent of forecasted travel demand? The second decision point determined if an alternative could address growth by providing the majority of the capacity needed to meet future travel demand on US 281. Alternatives with sufficient capacity to satisfy 50 percent or more of the forecasted 2035 travel demand were categorized as Primary Alternatives. Those that could not satisfy at least 50 percent of the forecasted travel demand but could be viable transportation solutions if combined with other transportation alternatives were passed along to the next decision point.

Decision Point 3:

- Can the alternative meet 50 percent of forecasted travel demand as a package? The third decision point evaluated the remaining alternatives for their ability to satisfy the 50 percent travel demand threshold as part of a package of alternatives. Those alternatives that were able to meet the threshold as a part of

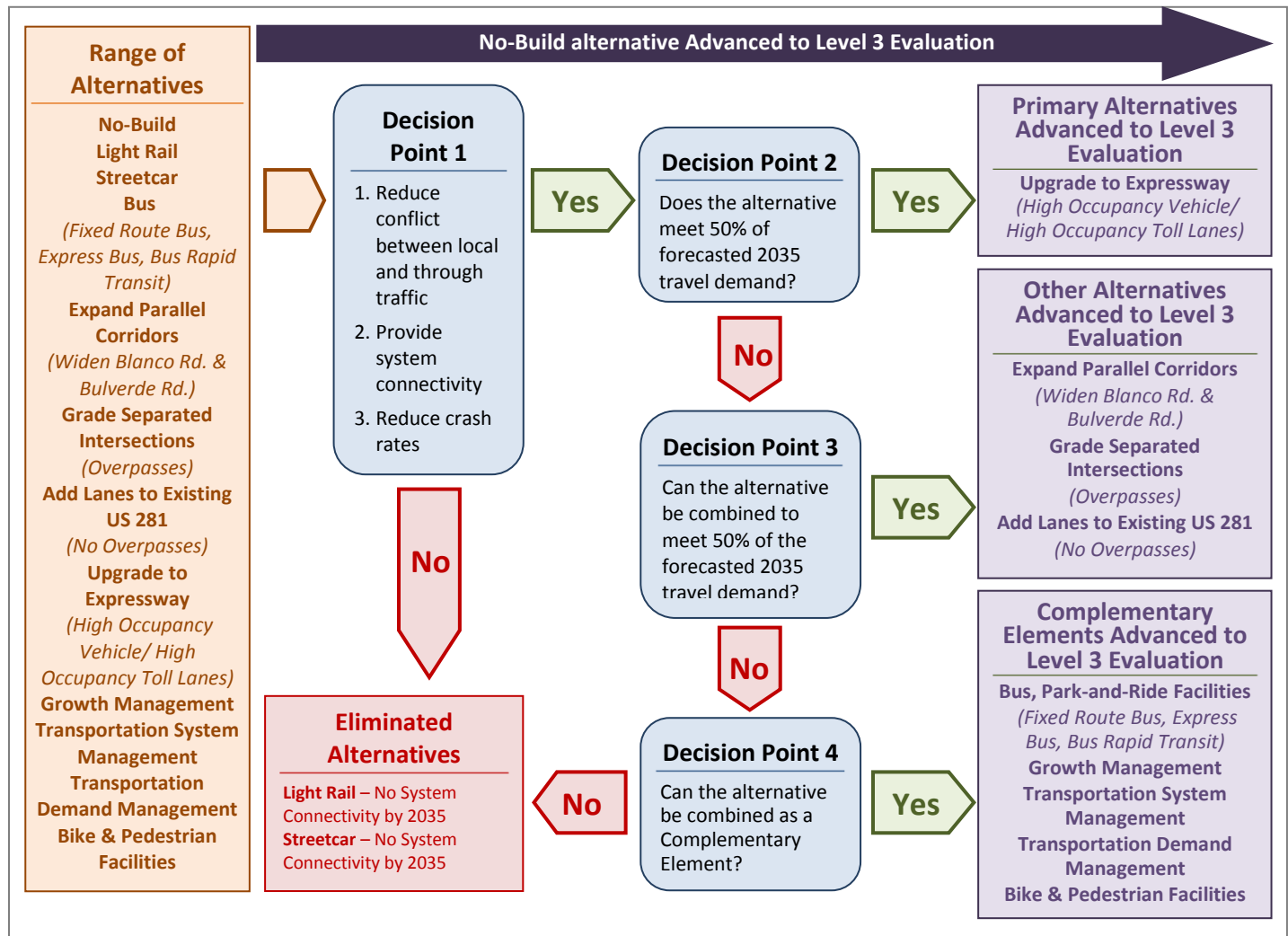


a package were categorized as Other Alternatives and those that could not were carried forward to the final decision point.

Decision Point 4:

- Can the alternative function as a Complementary Element? The remaining alternatives were then assessed for their ability to advance the project's Need and Purpose as a Complementary Element. Alternatives meeting this criterion were advanced as Complementary Elements and the remaining alternatives were eliminated.

Figure 2-6: Level 2 evaluation process and results



Source: US 281 EIS Team, 2010

Alternatives Eliminated

Level 2 evaluation resulted in the elimination of the light rail and streetcar alternatives due to the lack of system connectivity by 2035. Light rail or streetcar service is dependent on its ability to provide connections between desired origins and destinations; however, San Antonio does not currently have a light rail or streetcar system and is not likely to have a network extending to the US 281 project corridor by 2035. Based on preliminary findings of the transit long range plan, the Alamo RMA-VIA



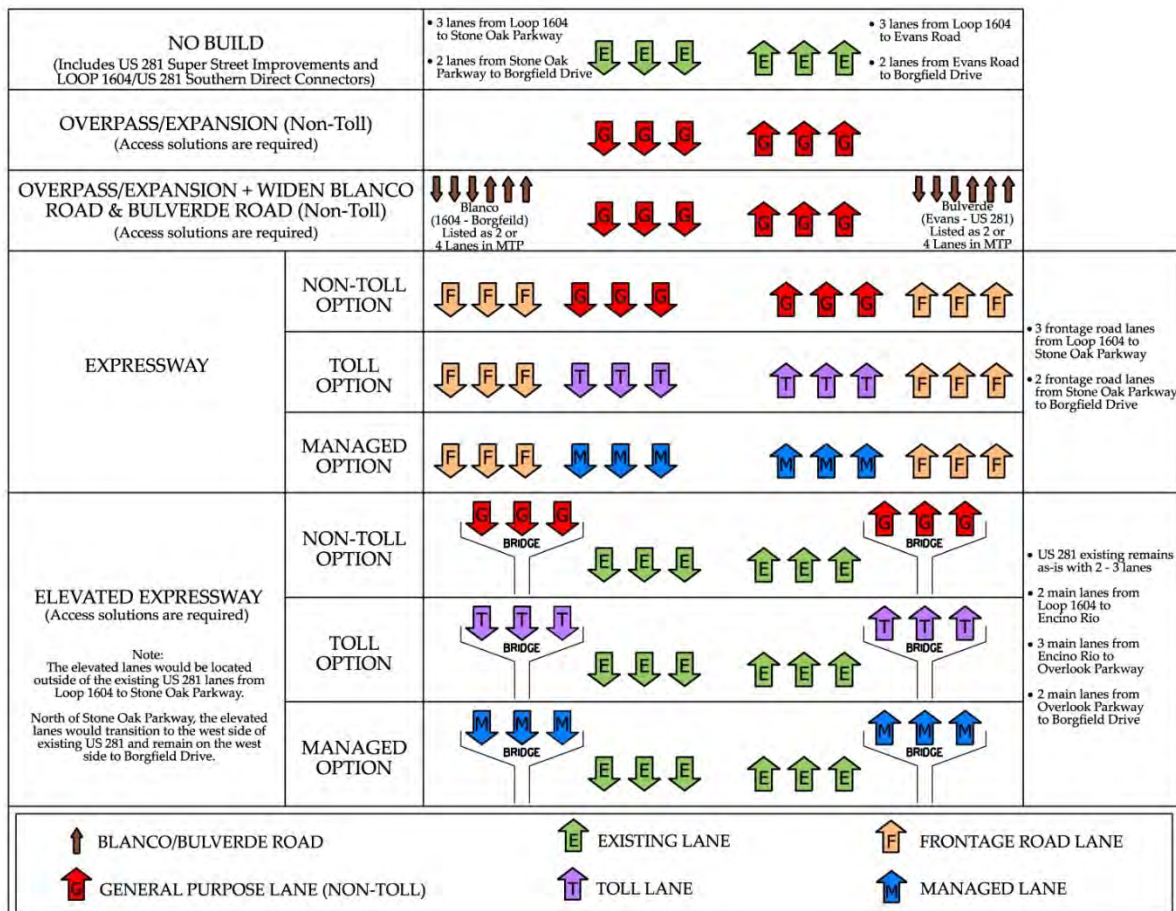
staff working group concurred that neither light rail transit nor streetcar alternatives warranted further consideration for the US 281 project corridor. However, the group agreed that improvements to the US 281 project corridor should not preclude the ability to support light rail or streetcar service in the future, beyond 2035. As a near-term improvement, the group agreed that express bus service operating from a new park-and-ride facility located at Stone Oak Parkway would support the project's need, purpose and objectives and should be included in all Proposed Build Alternatives.

The Alamo RMA and VIA executed a Letter of Agreement in July, 2010 regarding their shared commitment to near and long term transit facilities in the US 281 project corridor (Appendix L). In addition to ensuring that an envelope for potential future high capacity transit would be maintained within the US 281 right-of-way (ROW), and establishing temporary and permanent park-and-ride facilities at Stone Oak/TPC Parkway, the agreement called for investigating opportunities for multi-modalism and transit-oriented development.

Development of Multi-Modal Alternative Packages

Primary and Other Alternatives resulting from Level 2 evaluation were combined with the complimentary elements shown on Figure 2-6 to create four multi-modal alternative packages. Figure 2-7 illustrates the lane configurations proposed for each of the alternative packages advanced to Level 3 evaluation.

Figure 2-7: Lane configuration of alternatives analyzed in Level 3 evaluation



Source: US 281 EIS Team, 2010

**Overpass / Expansion**

The Overpass/Expansion alternative is a combination of two alternatives that were categorized as Other Alternatives in the Level 2 evaluation – Grade Separated Intersections and Add Lanes to Existing US 281. This alternative would provide overpasses at existing signalized intersections and make the US 281 project corridor a six-lane divided highway. This alternative would not include frontage roads along US 281 and has only partial access control.

Overpass / Expansion + Expand Parallel Corridors

This is an enhancement to the above alternative, Overpass / Expansion. In addition to overpasses and three general purpose lanes in each direction on US 281, this alternative included expanding Blanco Road from Loop 1604 to Borgfeld Drive and Bulverde Road from Evans Road to the crossing at US 281. This alternative analyzed expanding these two parallel corridors to six-lane divided facilities.

Expressway

The alternative would provide a limited access facility with grade-separated interchanges and continuous one-way frontage roads. It would consist of three main lanes and two/three frontage road lanes in each direction.

Elevated Expressway

The Elevated Expressway Alternative would have two-to-three elevated main lanes in each direction. These consist of two main lanes in each direction from Loop 1604 to approximately Encino Rio, three main lanes in each direction from Encino Rio to approximately Overlook Parkway, and two main lanes in each direction from Overlook Parkway to Borgfeld Drive. The existing US 281 general purpose lanes would be retained to serve as frontage roads for connecting with cross streets and driveways.

Project Financing and Tolling Considerations

The SA-BC MPO has determined that US 281 project corridor improvements are to be paid for through a combination of tolling and public funds. According to *Mobility 2035*, the proposed four main lanes from Loop 1604 to Stone Oak Parkway and direct connector ramps at the northern half of the US 281/Loop 1604 interchange would be non-toll. (Direct connector ramps at the southern half of the US 281/ Loop 1604 interchange are also non-toll.) Due to anticipated shortfalls in government funding for transportation improvements, pursuing the US 281 Corridor Project as a purely tax-funded facility could require that improvements be constructed in phases based on the annual availability of tax dollars. According to *Mobility 2035*, one of the possible ways to close the gap in transportation funding is to phase projects; that is, look for ways to construct only critical sections of roadway instead of the ultimate build-out in the near term. However, this approach could delay completion of the eight-mile US 281 Corridor Project indefinitely because of funding limitations. Traditional highway funding on a pay-as-you-go basis would also result in higher construction costs should future phases encounter increases in material and labor costs. Future updates of *Mobility 2035*, or future metropolitan transportation plans (MTPs), may result in a change in project funding for the US 281 Corridor Project. Project alternatives in this Draft EIS are therefore analyzed under both toll and non-toll scenarios. The Expressway and Elevated Expressway Alternatives consist of three funding options.



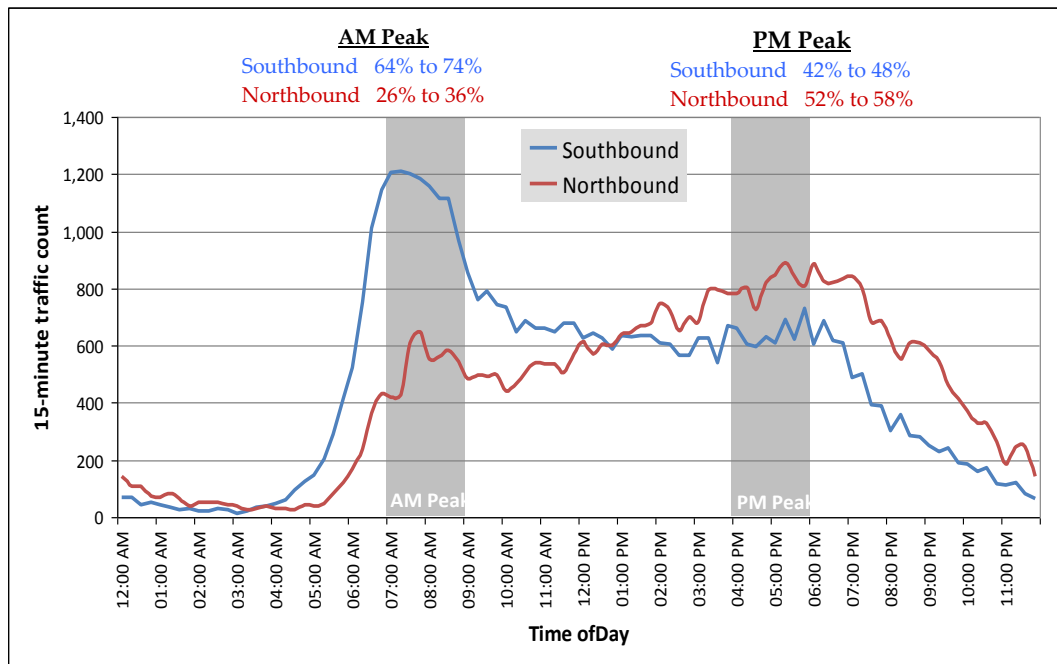
- 1 • *Non-Toll:* All vehicles would be allowed to use the main lanes and frontage road
- 2 lanes without paying a toll. This funding option would require modification to
- 3 *Mobility 2035*.
- 4 • *Toll:* All vehicles, unless exempted by Texas State Law, would pay a fixed fee
- 5 toll, in accordance with Alamo RMA toll policy, for access to tolled main lanes.
- 6 Under the State Toll Exemption Policy, approved by the Texas Transportation
- 7 Commission on April 26, 2007, the following types of vehicles are granted free
- 8 passage on toll roads: 1) authorized emergency vehicles, 2) marked military
- 9 vehicles, 3) contractors' vehicles working on the construction, improvement,
- 10 maintenance, or operation of the toll road, and 4) any vehicle in the time of a
- 11 declared emergency or natural disaster. The frontage road lanes would be non-
- 12 toll. If the Elevated Expressway was selected, a modification to *Mobility 2035*
- 13 would be required.
- 14 • *Managed:* Managed lanes are defined by the FHWA as "highway facilities or a
- 15 set of lanes where operational strategies are proactively implemented and
- 16 managed in response to changing (roadway) conditions" (FHWA 2007a).
- 17 Managed lanes can include operational elements such as HOV that control
- 18 access based on vehicle type and occupancy. For the US 281 Corridor Project, a
- 19 managed main lane would offer free passage for transit vehicles and for car
- 20 pools that are registered with a tag in place. All other vehicles, unless exempted
- 21 by Texas State Law, would pay a fixed fee toll, in accordance with Alamo RMA
- 22 toll policy. The frontage road lanes would be non-toll. This funding option
- 23 would require modification to *Mobility 2035*.

24 Reversible Lane Analysis

25 Another operational approach that was considered and falls within the managed lane
 26 concept is reversible lanes. This approach works best on highways when more than 60
 27 percent of all vehicles are traveling in the same direction during a peak period; generally
 28 traffic flows in the inbound direction during morning peak hours and outbound during
 29 evening peak hours. Traffic counts were performed on US 281 to understand traffic
 30 patterns including existing directionality of traffic during morning and evening peak
 31 hours. **Figure 2-8** depicts the traffic split in 15-minute intervals along US 281, 0.25 miles
 32 south of Encino Rio. As shown in the chart below, during the morning peak period, the
 33 traffic volume was between 64 and 74 percent in the southbound direction. However,
 34 during the evening peak, the directionality was such that northbound and southbound
 35 traffic volumes were more equally balanced. Traffic data at a location 0.25 miles north
 36 of Marshall Road show a similar profile. As directional split of traffic volume on US 281
 37 does not consistently meet the 60 percent threshold, reversible lanes were eliminated
 38 from further consideration.



1 **Figure 2-8: 15-minute traffic volumes 0.25 miles south of Encino Rio**



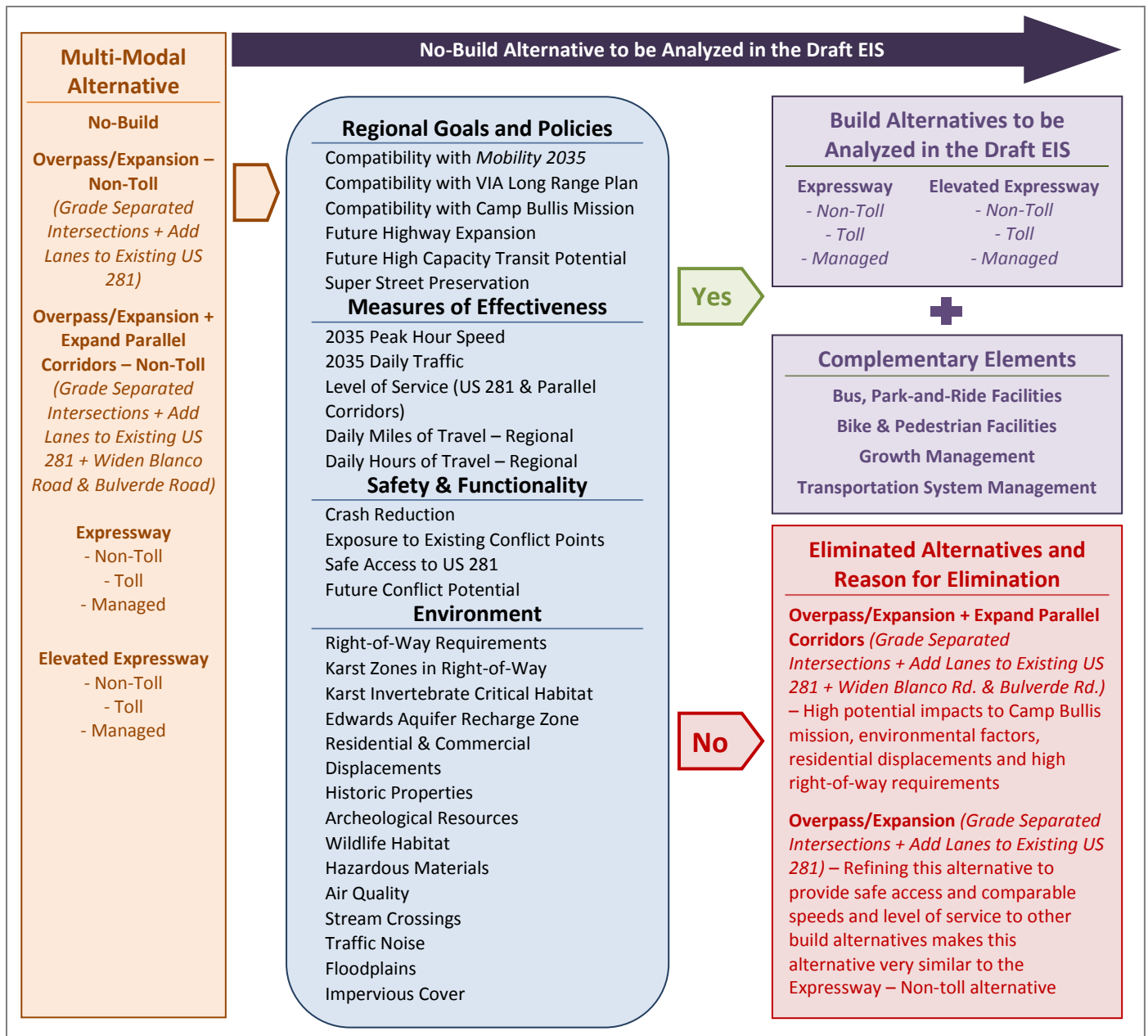
Source: US 281 EIS Team, 2010

2.3.4 Level 3 Alternatives Evaluation Process and Results

The Level 3 analysis evaluated the four multi-modal alternative packages against a set of quantitative and qualitative criteria. The Level 3 evaluation included specific criteria tied to the project's need, purpose and objectives (see **Figure 2-9**). These included regional goals and policies, MOEs, safety and functionality metrics, and environmental considerations. A matrix comparing all Level 3 alternatives for each factor can be found in **Appendix D**.



1 Figure 2-9: Level 3 evaluation process and results



2
3 Source: US 281 EIS Team, 2010



Alternatives Eliminated

Recommendations from the Level 3 evaluation were presented to the public and agencies in March/April 2010. Based on this input, the Overpass/Expansion + Expand Parallel Corridors Alternative was eliminated from further consideration in the Draft EIS. The Overpass/Expansion Alternative was further studied over the period from April 2010 to June 2011 in an attempt to refine the alternative to meet the project's Need and Purpose. However, though the alternative met some MOEs, it did not perform satisfactorily on all MOEs, and was therefore also eliminated from further consideration in the Draft EIS.

Reasons for Eliminating Overpass / Expansion + Expand Parallel Corridors

This alternative is a combination of three alternatives from the Level 2 evaluation. It combines the grade separated intersections (overpass), add lanes to existing US 281 (expansion), and expand parallel corridors (widen Blanco Road and Bulverde Road). This alternative, as presented at Public Meeting #3, proposed new grade separated intersections at Redland Road, Encino Rio, Evans Road, Stone Oak Parkway, Marshall Road, Wilderness Oaks, Overlook Parkway, Bulverde Road, and Borgfeld Drive. Additionally, US 281, Blanco Road, and Bulverde Road were expanded to three lanes in each direction from Loop 1604 to Borgfeld Drive (Evans Road to US 281 in the case of Bulverde Road). This alternative was recommended for elimination at Public Meeting #3 in April 2010 due to the following reasons:

- *Potential adverse impact to Camp Bullis mission.* The expansion of Blanco Road, which is adjacent to the eastern edge of Camp Bullis, could attract additional land development closer to the base. The increase in development around Blanco Road could bring additional light pollution that would interfere with the military's night-time operations. Noise disturbance from military operations at the base would be incompatible with increased residential land uses along Blanco Road.
- *Large number of potential residential displacements.* Widening of the parallel roadways would require approximately 34 residential displacements. The next closest alternative potentially displaces only two residences.
- *High potential for adverse environmental impacts.* Compared with the other alternatives, the ROW required for the widening of Blanco Road and Bulverde Road resulted in the highest acreage in the Edwards Aquifer Recharge Zone, the highest involvement of floodplain acres, the highest number of stream crossings and linear feet over streams, and the highest number of sensitive noise receivers within 500 feet. Quantifications of these potential impacts were displayed at the April 2010 Public Meeting and can be viewed at <http://www.411on281.com/us281eis/assets/File/US%20281%20EIS%20-%20Public%20Meeting%203%20-%20How%20do%20the%20Alternatives%20Compare%20to%20Each%20Other%20-%20Part%201.pdf>

In addition to the above factors that are mostly a result of the widening of Blanco Road and Bulverde Road, there were other MOEs like average peak period travel speed, average daily traffic, peak period LOS, and safe access that were lower than the Expressway and the Elevated Expressway alternatives. The lack of frontage roads or other forms of access control along stretches of US 281 would permit driveway proliferation, resulting in more vehicular conflicts and lower capacities on US 281.



Reasons for Eliminating Overpass/Expansion

This alternative is a scaled down version of the previous alternative, with only the additional lanes along US 281 and overpasses at the major intersections, but without any changes to Blanco Road and Bulverde Road as part of this project. The overall intent of the Overpass/Expansion Alternative, as presented at Public Meeting #3, was to develop a “smaller footprint, lower cost” approach to addressing the project’s Need and Purpose. This alternative proposed new grade separated intersections at Redland Road, Encino Rio, Evans Road, Stone Oak Parkway, Marshall Road, Wilderness Oaks, Overlook Parkway, Bulverde Road, and Borgfeld Drive. The Overpass/Expansion Alternative and the Elevated Expressway Alternative were presented with driveways and side streets colored red in numerous locations and noted that “Direct access may not be allowed as shown due to safety concerns. Further analysis is required to determine safe access solutions. Solutions include frontage roads, backage roads, and purchase of access rights.” (Backage roads are parallel to the highway, operate in separate right-of-way, and provide access on the “back” side of highway properties. They are different from frontage roads, which operate within the same right-of-way as the highway and provide access to the “front” side of highway properties.) In addition to safe access, other MOEs like average peak period travel speed, average daily traffic, and peak period LOS were also lower than the Expressway and Elevated Expressway alternatives. In the months following the April 2010 public meeting the US 281 EIS Team worked to identify safe access solutions and improve mobility performance.

The US 281 EIS Team analyzed two variations of the original Overpass/Expansion Alternative. The original alternative was presented at Public Meeting #3 in April 2010. The first variation was presented to the CAC and the PTRC in October 2010. The second variation (February 2011) was presented to the CAC in February 2011, and to the PTRC in June 2011. Slide presentations made to all CAC and PTRC meetings are posted to the project web site, available for viewing at <http://www.411on281.com/us281eis/>.

April 2010: This version of the Overpass/Expansion Alternative did not address safe access. It moved traffic much slower and at a lower LOS than the other Proposed Build Alternatives that were recommended for analysis in the Draft EIS. This alternative was refined by the US 281 EIS Team between April 2010 and October 2010.

October 2010: Design changes were made to the Overpass/Expansion Alternative between April 2010 and October 2010 in an effort to address safe access and improve mobility performance while retaining the original “smaller footprint, lower cost” intent of this alternative. Frontage roads were added between Loop 1604 and Stone Oak Parkway to provide safe access to the adjacent land uses. North of Stone Oak Parkway, traffic signals replaced originally proposed overpasses at Marshall Road, Wilderness Oaks, Overlook Parkway, Bulverde Road, and Borgfeld Drive, and an additional travel lane in each direction was added. Additionally, proposed ROW was expanded to include storm water management features. It should be noted here that the SA-BC MPO travel demand model was modified in June 2010 which resulted in slightly different metrics, even for those alternatives that did not change.

The revised alternative still substantially underperformed the Expressway and Elevated Expressway Alternatives. In the northern section, due to the addition of traffic signals and more vehicle conflicts associated with sidestreets and driveways, the average peak period speed decreased to 12 mph as compared to 37-49 mph for the Expressway and Elevated Expressway Alternatives. Additionally, the LOS for the corridor was much



lower for the Overpass/Expansion Alternative, and safe access concerns still remained north of Stone Oak Parkway.

February 2011: In order to mitigate safe access concerns and improve mobility in the northern section of US 281, additional changes were made to the October 2010 version. Overpasses were added to major intersections from Marshall Road to Borgfeld Drive in order to improve mobility along US 281. Short sections of discontinuous access roads and parallel driveways were included to provide safe access to the land uses along US 281. The US 281 EIS Team also investigated other strategies for addressing safe access, such as the acquisition of access rights and the construction of backage roads. These approaches were found to be prohibitively expensive (acquisition of access rights) and environmentally harmful (construction of backage roads). This assessment was presented to the Community Advisory Committee on February 16, 2011 and is available at <http://www.411on281.com/us281eis/index.cfm/community-advisory-committee/cac-meeting-5-february-16-2011/>.

The addition of overpasses and discontinuous access roads north of Stone Oak Parkway to the Overpass/Expansion Alternative improved the MOEs, although this alternative still resulted in a relatively high percentage of centerline miles at LOS E/F compared to the Expressway and Elevated Expressway Alternatives. Also, in most cases, the discontinuous access roads required a circuitous route for accessing the adjacent land uses, in turn creating “choke points” where traffic would have to make sharp u-turns, pass through multiple signals, and/or quickly accelerate/decelerate to avoid conflicts with the faster moving main lane traffic.

In summary, during the effort to analyze safe access solutions it was determined that the safest and most economical access could be provided by the use of a frontage road in most locations. To incorporate frontage roads throughout the corridor would provide an alternative that was very similar to the Expressway Alternative – Non-toll. After extensive traffic and engineering analysis, the “smaller footprint, lower cost” approach was not found to adequately address the access and mobility needs of the project. This alternative was therefore eliminated from further consideration in the Draft EIS.

2.3.5 Refinements to Proposed Build Alternatives

Two Proposed Build Alternatives and the No-Build Alternative were identified for detailed analysis in the Draft EIS following the completion of the Level 3 evaluation. Refinements to the Proposed Build Alternatives were made to address and resolve issues regarding safe access that were identified during the public involvement process. In addition, the conceptual engineering design for all the alternatives was modified to include accommodation for drainage detention and water quality treatment. These additional design modifications resulted in revisions to the ROW requirements for each alternative. The refinements made are further described by alternative below.

Expressway Alternative

Based on the results of the public meeting, the Expressway Alternative required minimal refinements as shown in **Table 2-3**.



1 **Table 2-3: Refinements to Expressway Alternative**

Description of Expressway April 2010	What Changed?
Expansion of US 281 to 6 access controlled main lanes from Loop 1604 to Borgfeld Drive.	No changes made to the main lanes.
Continuous, one-way, 3-lane frontage roads from Loop 1604 to Borgfeld Drive	No changes made to the frontage roads from Loop 1604 to Stone Oak Parkway. 2-lane frontage roads replaced the 3-lane frontage roads from Stone Oak Parkway to Borgfeld Drive.
Overpasses at: <ul style="list-style-type: none"> • Sonterra Boulevard • Redland Road • Encino Rio • Evans Road • Stone Oak Parkway • Marshall Road • Wilderness Oaks • Overlook Parkway • Bulverde Road • Borgfeld Drive 	No changes made to the proposed overpasses.
Direct connector ramps on the north side of the US 281/Loop 1604 Interchange.	No changes made to the direct connectors.
Additional ROW for storm water management not included.	The proposed ROW was adjusted to include storm water management features.

2 Source: US 281 EIS Team, 2011

3 **Elevated Expressway Alternative (Non-Toll/Toll/Managed)**

4 Access issues were predominantly focused in locations where new ramps would connect
5 traffic from the elevated lanes to the existing roadway. If not addressed, access to the
6 driveways in these areas would have been eliminated. The proposed solution to access
7 issues, as shown in **Table 2-4**, included several locations where two-way access roads
8 were needed to allow drivers to enter and exit these driveways; these access roads
9 would be in addition to the frontage roads. The areas of two-way access roads are
10 shown and labeled on the conceptual schematic found in **Appendix K1**.

11 **Table 2-4: Refinements to Elevated Expressway Alternative**

Description of Elevated Expressway April 2010	What Changed?
Expansion of US 281 to 4-6 elevated, access controlled main lanes from Loop 1604 to Borgfeld Drive.	No changes made to the main lanes.
Retention of existing US 281 lanes to serve as access roads for adjacent properties.	No changes made to the existing US 281 lanes. Several short sections of two-way access roads were added to allow drivers to safely enter and exit driveways near ramps.
Direct connector ramps on the north side of the US 281/Loop 1604 Interchange.	No changes made to the direct connectors.
Additional ROW for storm water management not included.	The proposed ROW was adjusted to include storm water management features.

12 Source: US 281 EIS Team, 2011



2.4 ALTERNATIVES CONSIDERED IN THE DRAFT EIS

Two Build Alternatives are included for detailed analysis in the Draft EIS based on the results of the alternatives evaluation process and input from the agencies and the public. These two reasonable Build Alternatives and the No-Build Alternative are studied equally to compare the effects associated with each alternative.

2.4.1 No-Build Alternative

The No-Build Alternative assumes the proposed US 281 improvements would not be built but does include all other transportation improvements as programmed in *Mobility 2035*. The No-Build Alternative is considered the baseline alternative for comparison to the two Proposed Build Alternatives.

The US 281 No-Build Alternative is based on the current conditions of the US 281 project corridor and includes:

- US 281 Super Street: the operational improvements at the intersections of US 281 with Encino Rio, Evans Road, Stone Oak Parkway, and Marshall Road completed in 2010
- the four direct connector ramps that comprise the southern half of the US 281 interchange with Loop 1604 (anticipated completion in 2012)
- all planned regional transportation improvements included in *Mobility 2035* (except for the planned improvements to the US 281 project corridor)
- short-term minor maintenance and safety improvements that maintain the continued operation of the US 281 project corridor.

A range of Congestion Management Process (CMP) projects aimed at improving air quality is included in the No-Build Alternative. In 2011, the SA-BC MPO area is in attainment of the National Ambient Air Quality Standards (NAAQS), but is vulnerable to be designated as non-attainment for ozone in the next few years. In regions designated as ozone or carbon monoxide non-attainment areas, the CMP takes on a greater significance, as federal guidelines prohibit transportation projects that increase capacity for single occupant vehicles unless the project comes from a CMP.

CMP projects included in *Mobility 2035* include TDM, TSM, Intelligent Transportation Systems (ITS)/Advanced Transportation Management (ATM), transit, and bicycle and pedestrian improvements. Examples of the SA-BC MPO's long range planning initiatives to manage congestion in CMP corridors such as the US 281 project corridor include:

- *Operational Management* (i.e., TSM) – techniques to optimize capacity and improve safety and reliability of the roadway system. For example, Incident Management focuses on clearing incidents, crashes and major events to allow traffic flow to resume.
- *Community Campaigns* (i.e., TDM) – strategies to reduce automobile use and congestion. The Alamo Area Council of Governments' "Commute Solutions Program" and "River Cities Rideshare" Program, and the SA-BC MPO's Walkable Community Program lead these efforts.



- *Growth Management/Land Use* – better control over land use to discourage urban sprawl and promote higher density levels and mixed use development to encourage travel by walking, bicycling and transit.
- *Access Management* – controlling the number and placement of access points such as driveways.

Under the No-Build Alternative, the existing transportation infrastructure in the project corridor would remain unchanged for the foreseeable future. The No-Build Alternative, which was studied during the alternatives evaluation process, would not satisfy the forecasted travel demand, would not be consistent with local and regional plans and policies, would not develop facilities for multi-modal transportation, would not reduce travel time and increase travel speeds, would not reduce conflicts between local and through traffic, would not improve access to adjacent property, would not reduce crash rates, and would not improve community quality of life. The No-Build Alternative does not meet the need, purpose and objectives of the US 281 Corridor Project, and as such, is not a reasonable alternative. (See the summary information provided in **Table 2-5**.) However, it is evaluated in this EIS to provide a baseline against which the impacts of the build alternatives can be assessed.

2.4.2 Proposed Build Alternatives

Expressway Alternative

The Expressway Alternative extends approximately 7.3 miles from Loop 1604 to approximately 0.6 miles north of Borgfeld Drive. (**Figure 2-10a** through **Figure 2-10c**). This alternative consists of three, full access-controlled through travel lanes in each direction (**Figure 2-11**). No streets or driveways would access the through lanes directly. Grade separations would be provided at Sonterra Boulevard, Redland Road, Encino Rio, Evans Road, Stone Oak Parkway, Marshall Road, Wilderness Oaks, Overlook Parkway, Bulverde Road, and Borgfeld Drive to allow the express lanes to pass uninterrupted over the cross streets; thus, the express lanes would not intersect directly with these local streets. The express lanes would be situated between partial access-controlled outer lanes, also known as frontage roads. The frontage road lanes, which would cross local streets at grade via signalized intersections, would be continuous for the length of the proposed project and serve local traffic by providing direct access to businesses, neighborhoods and connecting streets. Under this alternative neither the existing US 281 travel lanes nor the existing US 281 Super Street would remain in place. Four direct connector ramps would be provided at Loop 1604 to provide mainlane to mainlane connections for US 281 motorists travelling westbound Loop 1604 to northbound US 281, southbound US 281 to eastbound Loop 1604, eastbound Loop 1604 to northbound US 281, and southbound US 281 to westbound Loop 1604. The proposed ROW would typically be 400 to 450 feet wide (wider at the interchanges). From Sonterra Boulevard north to Borgfeld Drive, the main lanes would be separated by a 28-foot median capable of supporting potential future capacity improvements, such as high capacity transit. The Expressway Alternative requires approximately 128 acres of additional ROW.

The Expressway Alternative begins with the northern direct connector ramps with Loop 1604 and heads in a north-northeast direction towards Sonterra Boulevard. Approximately 0.4 miles north of Loop 1604 the main lanes and frontage roads pass under Sonterra Boulevard, while the direct connector ramps pass over the Sonterra Boulevard bridge. At Redland Road, approximately 0.5 miles north of Sonterra

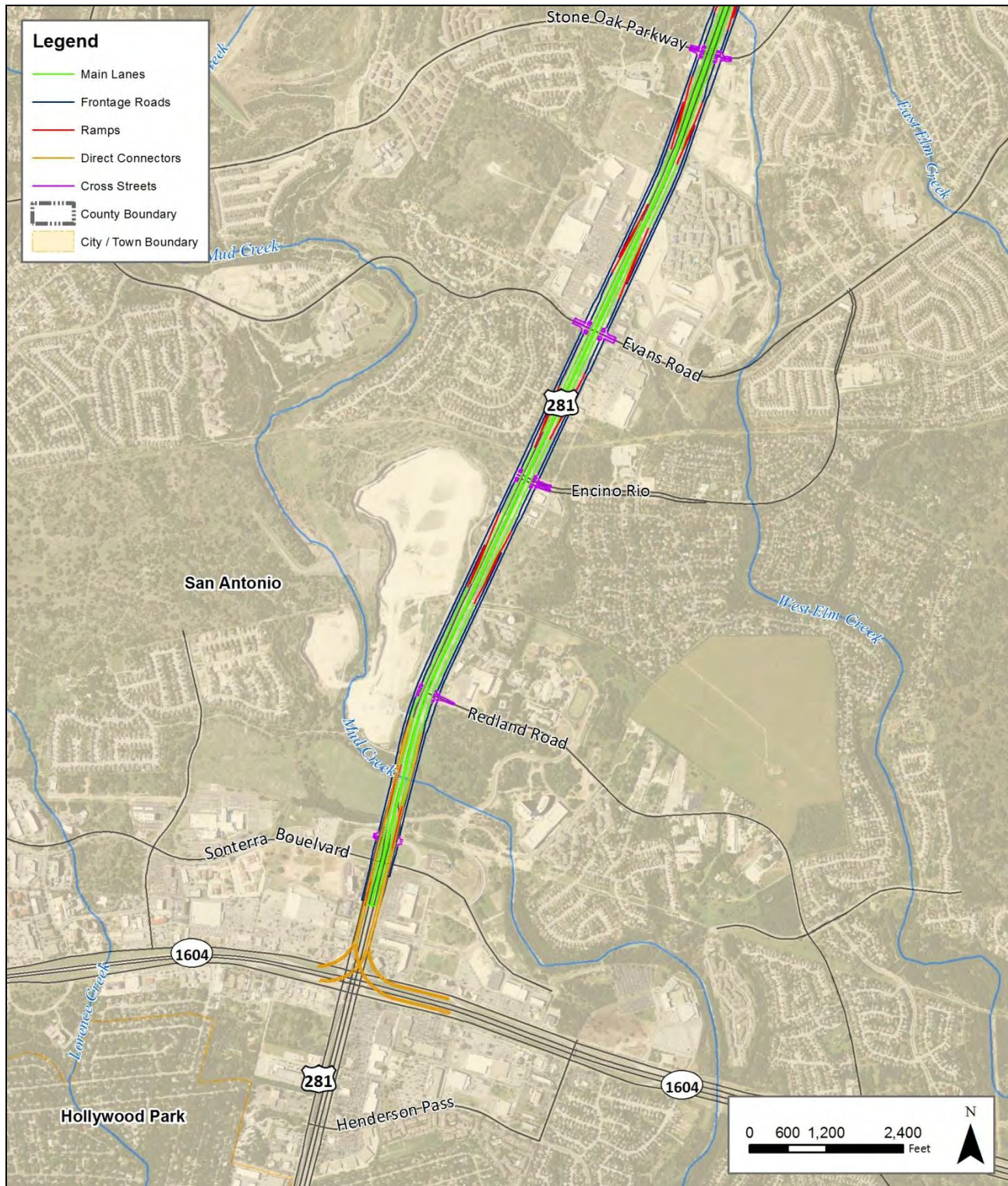


Boulevard, the direct connector ramps with Loop 1604 connect into the main lanes and the alignment turns to the northeast for 2.1 miles crossing over Encino Rio, Evans Road, and Stone Oak Parkway. At Stone Oak Parkway, the alignment turns north for 1.3 miles across Marshall Road heading towards Mountain Lodge. At Mountain Lodge, the alignment curves slightly to the north-northwest for 0.9 miles passing over Wilderness Oak and Overlook Parkway. From here north to the project terminus additional ROW for this alternative is obtained primarily from the west side of US 281. Expanding the ROW to the west side would result in fewer potential commercial and residential displacements. From Overlook Parkway interchange, the alignment turns to the north-northeast for 2.1 miles crossing Bulverde Road heading towards Borgfeld Drive. Near the interchange with Borgfeld Drive, the Expressway Alternative turns northeast for 0.6 miles across Borgfeld Drive and transitions down to four lanes to match the existing US 281 facility before crossing Cibolo Creek. The exact extent of the transition area is subject to the engineering requirements for connecting with existing US 281. (See conceptual schematic in **Appendix K1**.)

The Expressway Alternative, which was studied during the alternatives evaluation process, would satisfy the forecasted travel demand, is consistent with *Mobility 2035*, would develop facilities for multi-modal transportation, would reduce travel time and increase travel speeds, would reduce conflicts between local and through traffic, would improve access to adjacent property, would reduce crash rates, and would improve community quality of life. The Expressway Alternative meets the need, purpose and objectives of the US 281 Corridor Project. (See the summary information provided in **Table 2-5**.)



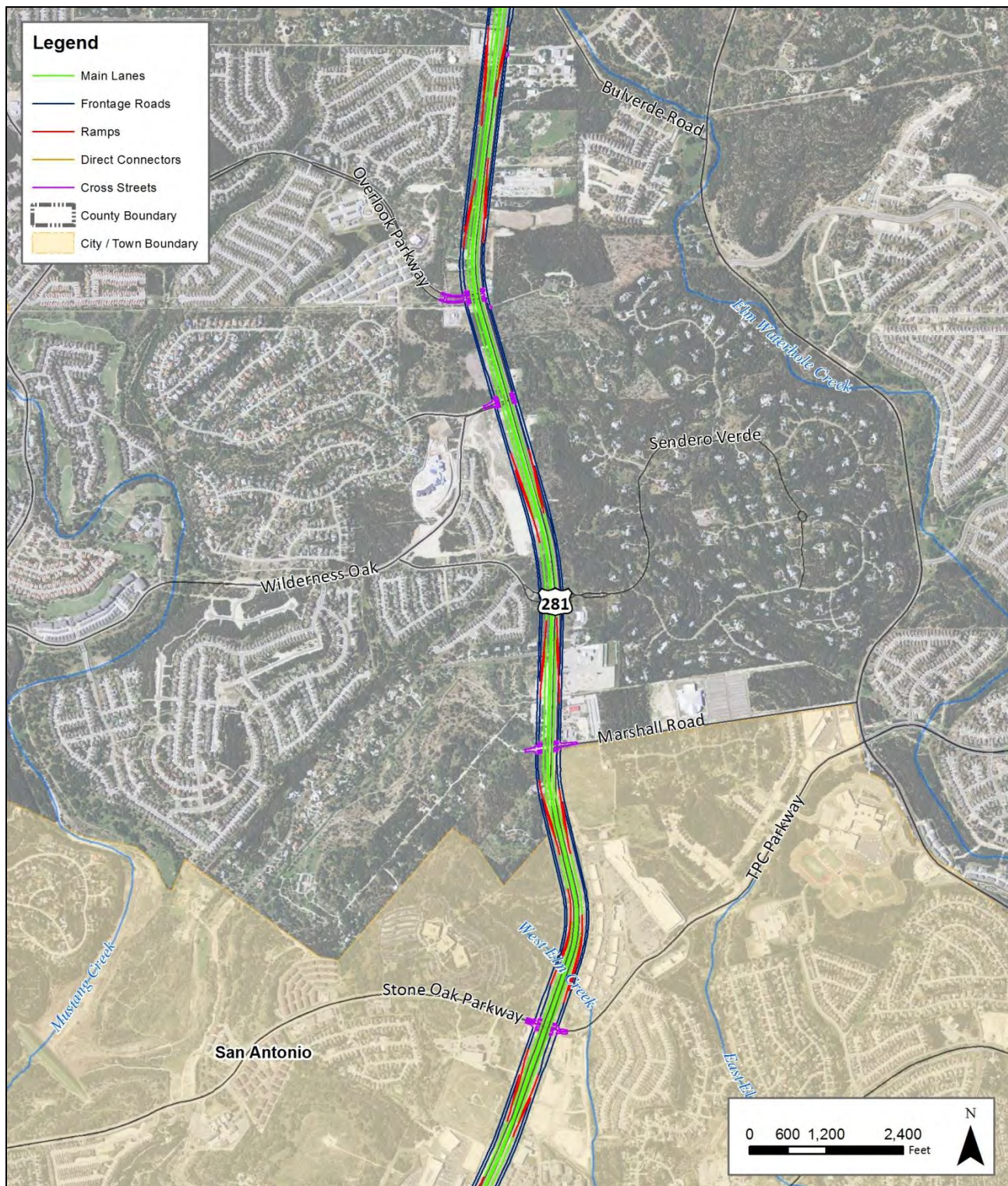
1 **Figure 2-10a: Expressway Alternative**



Source: US 281 EIS Team, 2011



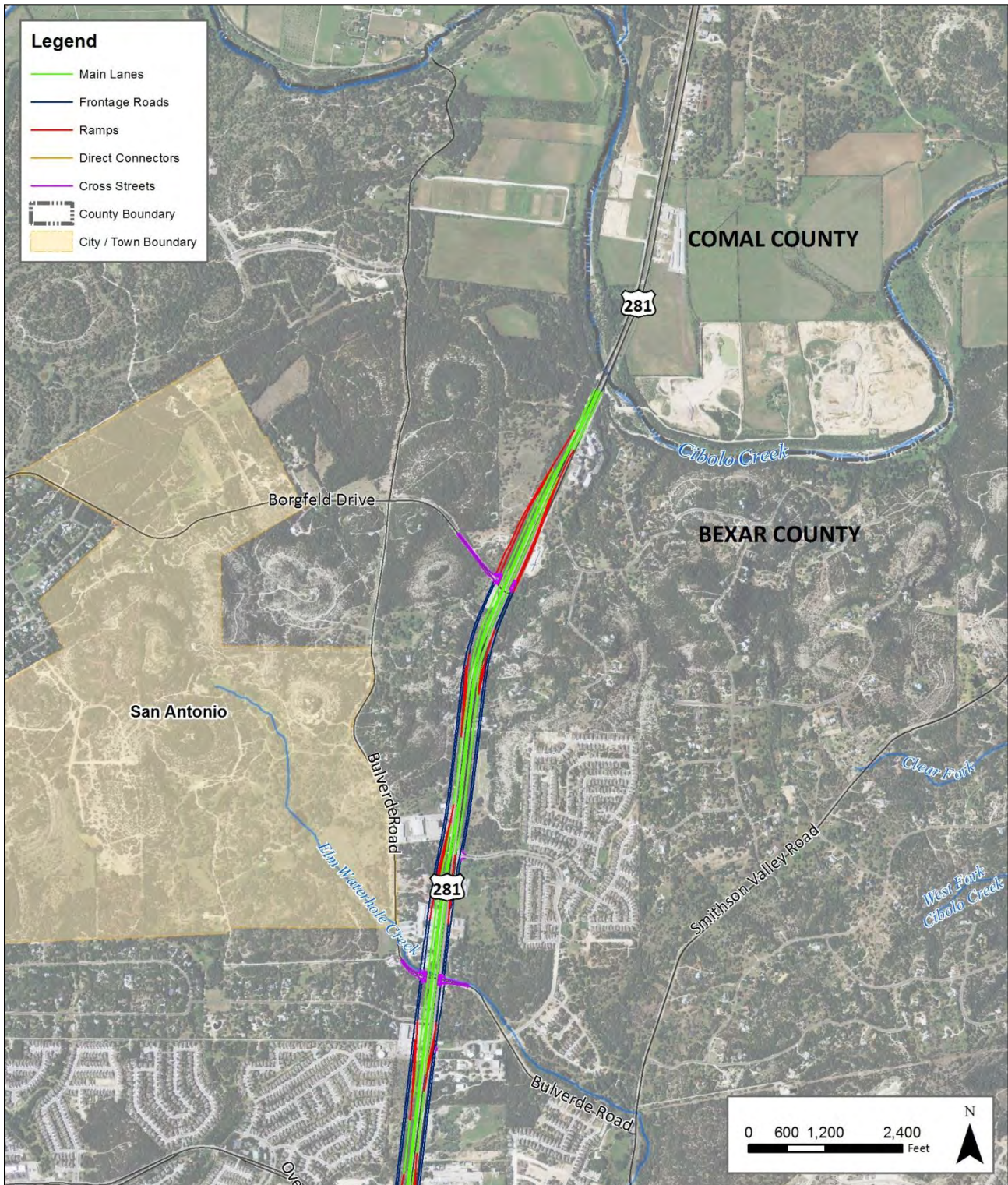
1 **Figure 2-10b: Expressway Alternative**



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3 Source: US 281 EIS Team, 2011



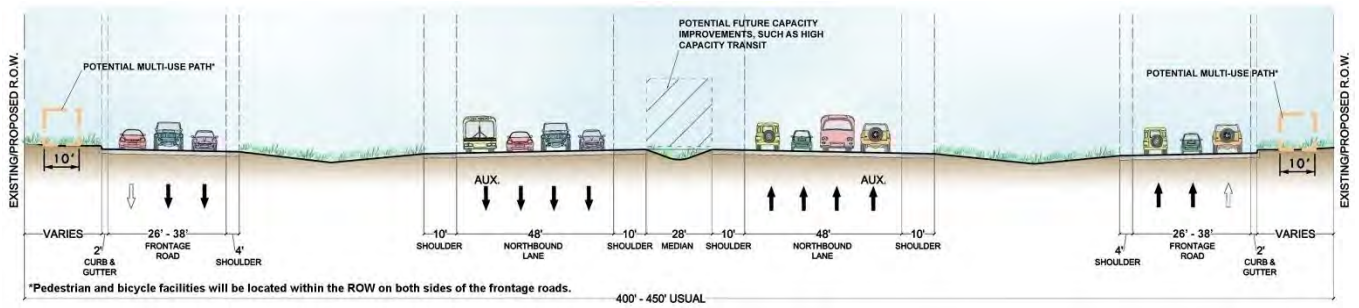
1 **Figure 2-10c: Expressway Alternative**



2
3 Source: US 281 EIS Team, 2011



1 Figure 2-11: Expressway Alternative typical section



Source: US 281 EIS Team, 2012.

4 Elevated Expressway Alternative

The Elevated Expressway Alternative extends approximately 7.3 miles from Loop 1604 to approximately 0.5 miles north of Borgfeld Drive (see **Figure 2-12a** through **Figure 2-12c**). This alternative consists of two-to-three, full access-controlled through travel lanes in each direction (three lanes from Loop 1604 to approximately Overlook Parkway and two lanes north of Overlook Parkway to Borgfeld Drive). No streets or driveways would access the through lanes directly. The express lanes would be elevated for the length of the project corridor, passing uninterrupted over Sonterra Boulevard, Redland Road, Encino Rio, Evans Road, Stone Oak Parkway, Marshall Road, Wilderness Oaks, Overlook Parkway, Bulverde Road, and Borgfeld Drive. At Loop 1604, the northbound and southbound elevated express lanes will connect directly to eastbound and westbound Loop 1604. From Loop 1604 north to Stone Oak Parkway, the elevated express lanes would be built on the outside of the existing US 281 roadway (**Figure 2-13**) and would transition to the west side of the existing US 281 roadway north of Stone Oak Parkway to Borgfeld Drive (**Figure 2-13**). The existing US 281 travel lanes, including a portion of the US 281 Super Street, would remain in place as partial access-controlled lanes, crossing local streets at grade via signalized intersections for the length of the proposed project, serving local traffic by providing direct access to businesses, neighborhoods and connecting streets. The proposed ROW would typically be 384 to 400 feet wide. A median of 37 feet (average width) would provide for potential future capacity improvements, such as high capacity transit, south of Stone Oak Parkway. After the northbound elevated section shifts to the west side of existing US 281, the area for potential future capacity improvements shifts to between the elevated structures and continues north to Borgfeld Drive. The Elevated Expressway Alternative requires approximately 99 acres of additional ROW.

This alternative begins with the northern direct connector ramps for the US 281 / Loop 1604 interchange and heads in a north-northeast direction towards Sonterra Boulevard. Approximately 0.4 miles from Loop 1604 the main lanes and frontage roads pass under Sonterra Boulevard, while the direct connectors pass over the Sonterra Boulevard bridge. Approximately 0.7 miles beyond Sonterra Boulevard, north of Redland Road the direct connector ramps transition into the elevated main lane structures on the outside of existing US 281 and are approximately 30 to 50 feet in the air. From Redland Road the alignment turns to the northeast for 2.1 miles crossing over Encino Rio, Evans Road, and Stone Oak Parkway. On the north side of Stone Oak Parkway, the northbound elevated roadway transitions over existing US 281 to the west side adjacent to the southbound elevated structure. From here north to the project terminus additional ROW for this alternative is obtained primarily from the west side of US 281. Expanding the ROW to



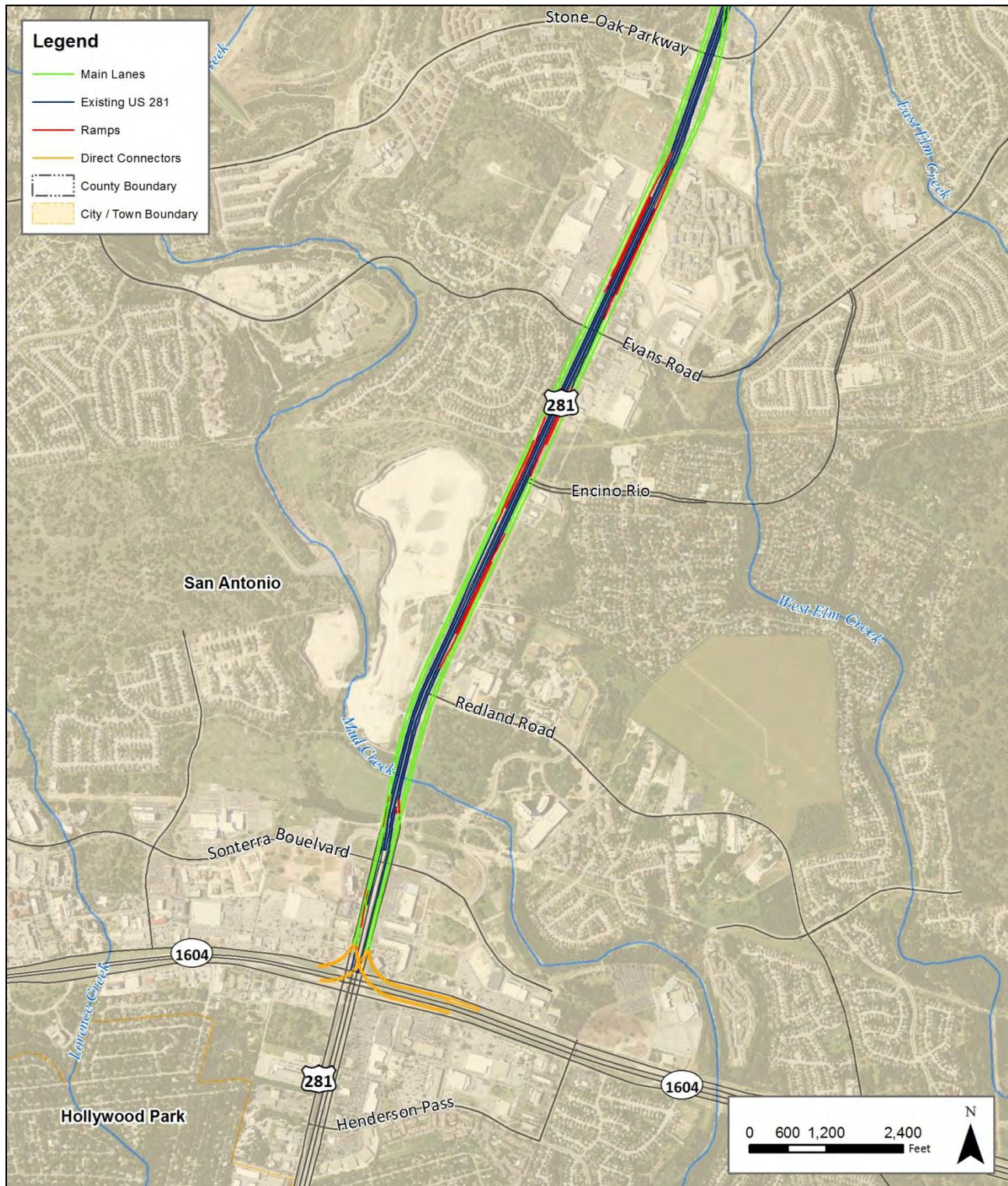
the west side would result in fewer potential commercial and residential displacements. At the transition the alignment turns north for 1.3 miles across Marshall Road heading towards Mountain Lodge. At Mountain Lodge, the roadway curves slightly to the north-northwest for 0.9 miles passing over Wilderness Oak and Overlook Parkway. From Overlook Parkway crossing, the alignment turns to the north-northeast for 2.1 miles passing Bulverde Road heading towards Borgfeld Drive. Near the interchange with Borgfeld Drive, the Elevated Expressway Alternative turns northeast for 0.6 miles across Borgfeld Drive and the elevated structures transition down into existing US 281 before crossing Cibolo Creek. The exact extent of the transition area is subject to the engineering requirements for connecting with existing US 281. (See conceptual schematic in **Appendix K1**.)

The Elevated Expressway Alternative, which was studied during the alternatives evaluation process, would satisfy the forecasted travel demand, would develop facilities for multi-modal transportation, would reduce travel time and increase travel speeds, would reduce conflicts between local and through traffic, would improve access to adjacent property, would reduce crash rates, and would improve community quality of life. However, this alternative is not fully consistent with *Mobility 2035*; it provides two-three main lanes in each direction rather than the “six lane” facility described in the MTP.

The Elevated Expressway Alternative meets the need, purpose and objectives of the US 281 Corridor Project. (See the summary information provided in **Table 2-5**.)



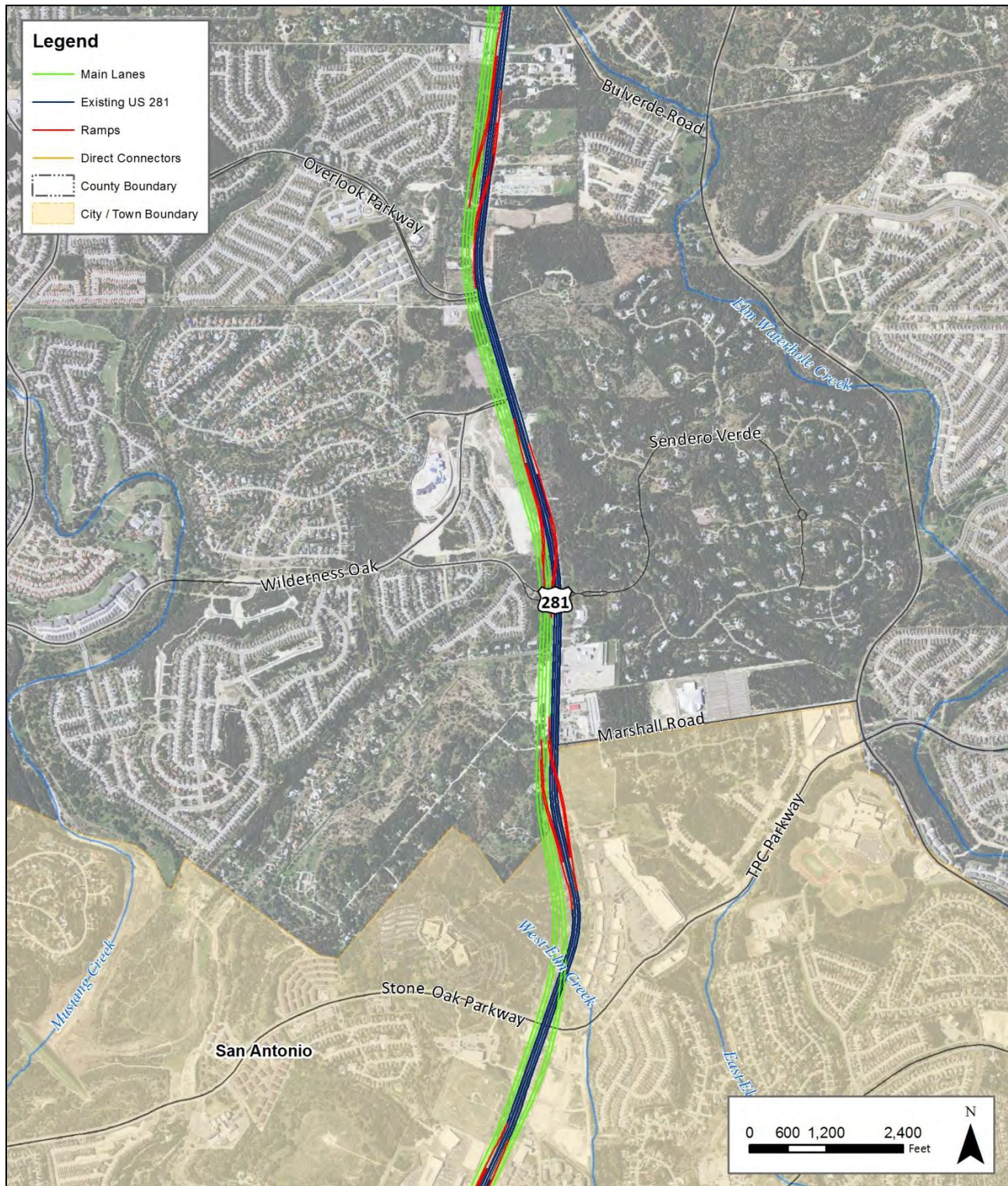
1 **Figure 2-12a: Elevated Expressway Alternative**



2
3 Source: US 281 EIS Team, 2011



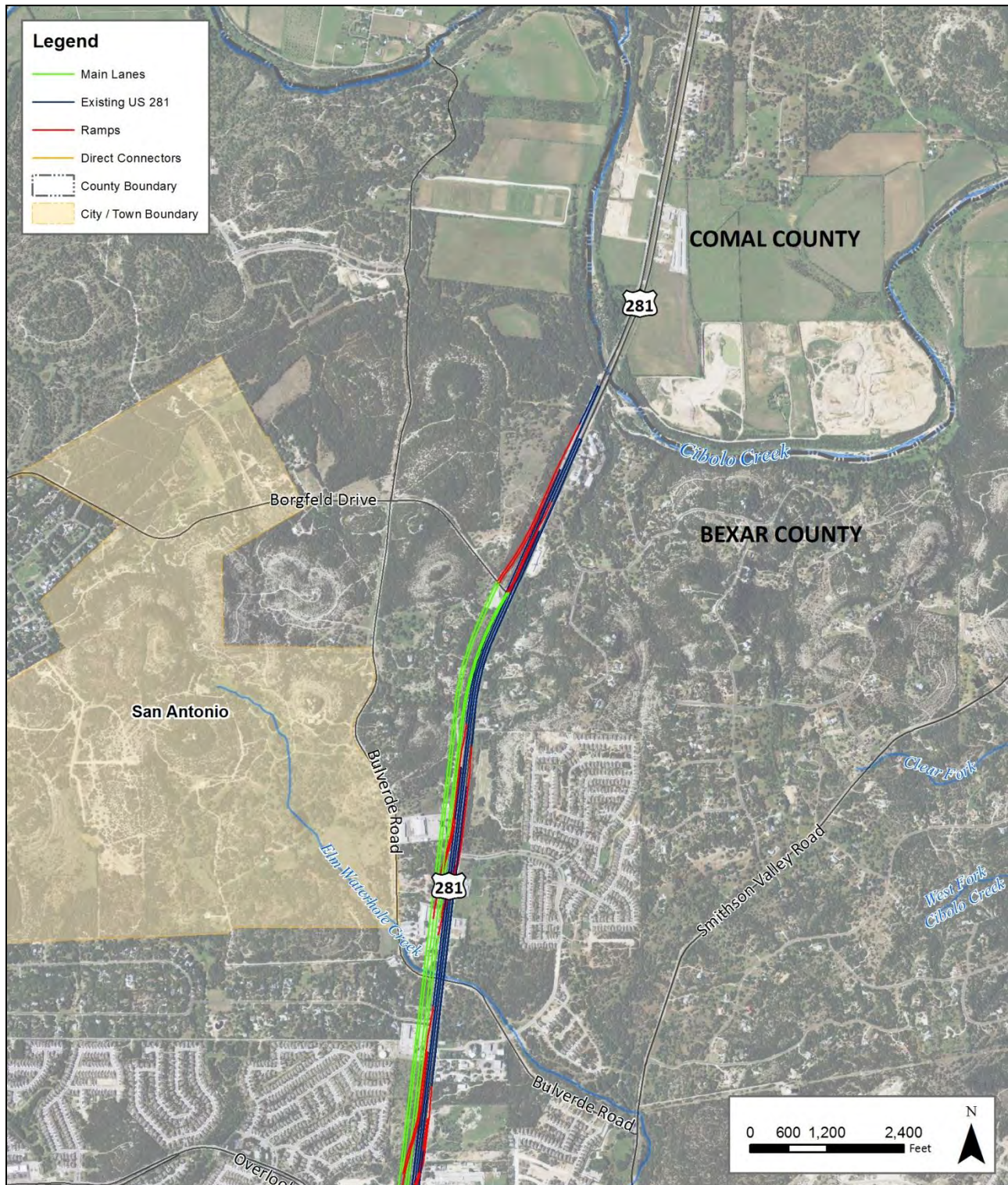
1 **Figure 2-12b: Elevated Expressway Alternative**



2
3 Source: US 281 EIS Team, 2011



1 **Figure 2-12c: Elevated Expressway Alternative**

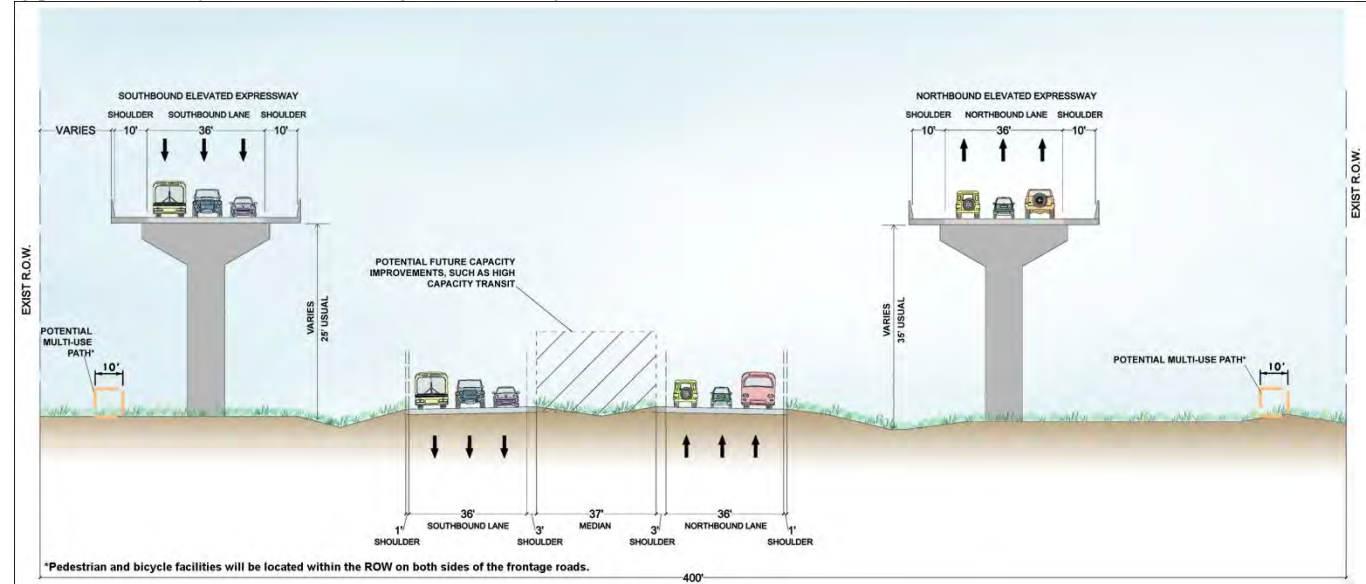


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3 Source: US 281 EIS Team, 2011

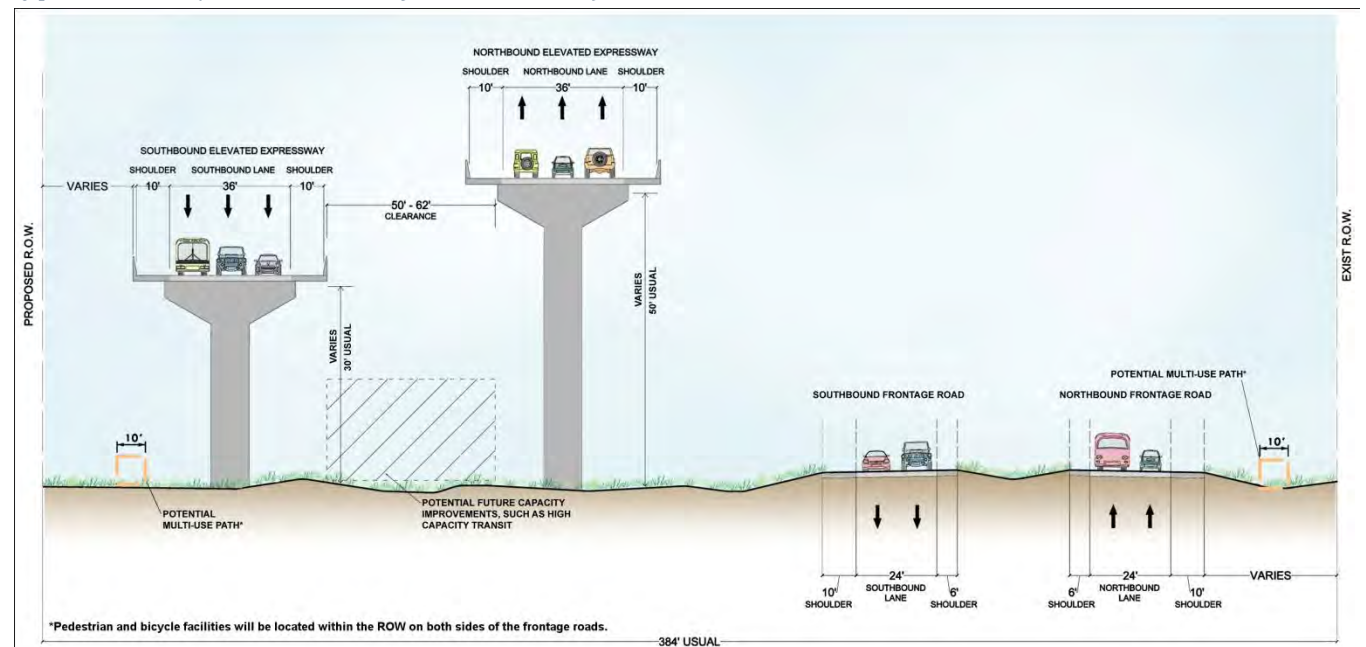


Figure 2-13: Elevated Expressway Alternative typical section

Typical section (0.1 miles south of Evans Road)



Typical section (0.1 miles north of Marshall Road)



Source: US 281 EIS Team, 2011.

Elements Common to All Proposed Build Alternatives

The following strategies, facilities, landscaping and aesthetic improvements, and potential future transportation systems are included in each of the Proposed Build Alternatives. Proposed facilities and improvements are conceptual and would be developed and presented in more detail in the Final EIS for the Preferred Alternative.

Congestion Management Strategies

Both Proposed Build Alternatives include the projects, CMP elements, and strategies included in the No-Build Alternative. These strategies are described in detail in ES 4.1 and would occur regardless which alternative is selected in the US 281 EIS.

**1 Northern Half of the US 281 Interchange with Loop 1604**

2 All Proposed Build Alternatives include the construction of the four direct connector
3 ramps that comprise the northern half of the US 281 / Loop 1604 interchange.

4 Bus Park-and-Ride Facility

5 All Proposed Build Alternatives include provision of a bus park-and-ride facility in the
6 immediate vicinity of the proposed US 281 interchange with Stone Oak Parkway/TPC
7 Parkway. VIA would operate the facility and provide express bus service to and from
8 downtown San Antonio. More detailed design of the proposed transit facility would be
9 included in the Final EIS as part of the Preferred Alternative.

10 Bicycle and Pedestrian Facilities

11 Bicycle and pedestrian facilities will be located within the US 281 project corridor ROW
12 on both sides of the frontage roads of all Proposed Build Alternatives, in compliance
13 with the USDOT *Policy Statement on Bicycle and Pedestrian Accommodation Regulations and*
14 *Recommendations* (March 11, 2010) and TxDOT's *Guidelines Emphasizing Bicycle and*
15 *Pedestrian Accommodations* (March 23, 2011). These facilities could take the form of
16 bikeable shoulders or wide curb lanes on the frontage roads, multi-use paths, sidewalks,
17 audible signals and crosswalks. More detailed design of bicycle and pedestrian facilities
18 would be included in the Final EIS as part of the Preferred Alternative.

19 Context Sensitive Solutions and Low-Impact Development

20 The Proposed Build Alternatives include the design and implementation of Context
21 Sensitive Solutions (CSS). CSS is a collaborative, interdisciplinary approach that
22 involves all stakeholders in providing a transportation facility that fits its setting. It is an
23 approach that leads to preserving and enhancing scenic, aesthetic, historic, community,
24 and environmental resources, while improving or maintaining safety, mobility, and
25 infrastructure conditions (Center for Transportation and the Environment 2007).
26 Potential CSS designs include low-impact development (LID) approaches to managing
27 storm water runoff, using wind and solar energy, creating a sense of place through
28 aesthetic treatments, and developing multi-modal connections. Aesthetic approaches
29 include landscaping with native plants, artistic treatments for columns and retaining
30 walls, and accent lighting.

31 Related to water quality, a CSS approach would feature natural processes of water
32 filtration and pollutant removal. LID methods are more encompassing and mimic the
33 "natural," pre-construction condition of storing, filtering, infiltrating and evaporating of
34 water runoff close to the source, which decreases the downstream impact of increased
35 impervious cover. Examples of these include bioswales and rain gardens. More
36 detailed CSS and LID design concepts will be identified for the Preferred Alternative, as
37 appropriate, in the Final EIS.

**38 Accommodation of Potential Future Capacity Improvements, such as High
39 Capacity Transit**

40 All Proposed Build Alternatives include space within the proposed right-of-way for
41 potential future capacity improvements. These could take the form of additional travel
42 lanes for transit or non-transit vehicles, or fixed-guideway facilities for public
43 transportation. All Proposed Build Alternatives provide an "envelope" within which the
44 vertical and horizontal geometry would be adequate to accommodate a potential future
45 high capacity transit system. Examples of such a system include bus rapid transit,
46 streetcars and light rail transit. As a potential future project not included in the



currently proposed improvements addressed by this EIS, these capacity improvements within the US 281 project corridor would be subject to additional project approvals and public involvement requirements.

Options with Toll Collection Facilities

US 281 has the potential option to be a tolled facility under each Proposed Build Alternative. The exact amount of toll, whether toll or managed lanes, has not been determined but would be in accordance with the Alamo RMA *Amended and Restated Policies and Procedures for Toll Collection Operations on the Alamo RMA Turnpike System*, established pursuant to Alamo RMA Resolution No. 07-20, adopted on October 10, 2007 and revised by Resolution No. 12-08 adopted and approved by the Alamo RMA Board of Directors on April 12, 2012 under the provisions of Chapter 370 of the Texas Transportation Code. The adopted policy may be found at <http://www.alamorma.org/default/assets/PDF/Alamo%20RMA%20Toll%20Policies%20-%20Adopted%20and%20Approved%20April%2012,%202012.pdf>

Under the RMA's toll policy initial toll rates may be set in the range of \$0.17 to \$0.50 per mile for toll facility usage, dependent on the final project financial plan as developed and approved by the Alamo RMA Board of Directors. Toll rates will be set on a project by project basis for the type of facility and with approval by the Alamo RMA Board of Directors. Authorized emergency vehicles, as well as state and federal military vehicles, are exempt from paying tolls. VIA and other public transit vehicles operated by a public agency are permitted free usage of any managed lanes in operation by the Alamo RMA. On traditional toll facilities without the managed lane designation, exemptions will be established on an annual basis between the Alamo RMA and the public agency transit provider based on projected usage within the toll corridor. Users who are part of a registered car pool that have a declared vehicle as part of a carpool as a funded account with a tag will be able to use the managed lane facility for no charge. On toll facilities without the managed lane designation, the tag account will be charged the published rate for a toll tag transaction as determined by the Alamo RMA on an annual basis.

The toll collection system for US 281 would operate under a fully electronic format. Vehicles would not have to stop to pay a toll, rather vehicles would pass through electronic readers to be assessed a toll charge. This is known as an electronic toll collection system (ETC). The ETC equipment would be placed on toll gantries positioned at certain locations along the mainlanes and at some ramps.

As proposed, tolls would be collected using a completely electronic system; the system would not be able to accept cash. Tolls would be collected by reading stickers or toll tags that contain an electronic chip linked to a prepaid account as a vehicle passes under a toll gantry. The video portion of the tolling system would also record a photograph of the vehicle's license plate for those users who do not have an active toll account. Based on this video monitoring, an invoice would be mailed monthly to the registered owner of the vehicle for the tolls incurred with an additional fee included for billing and handling. This video tolling program allows motorists to travel the tolled lanes without needing a transponder and without needing to stop and pay. Those users electing to utilize the video tolling system, in lieu of having a toll tag account, will see an additional amount, no less than 33 percent but no more than 50 percent of the total toll fees added to cover the processing costs for each video transaction in

ETC – North Texas Tollroad Authority, Dallas, Texas.





addition to a \$1.00 handling charge. The specific amount of a video toll surcharge will be determined prior to operational activity by the Alamo RMA for the tolling system and will be reviewed annually.

The toll gantries would span both directions of travel on a structure similar to a typical sign bridge. The gantry would support ETC reader units, video enforcement system cameras, illumination devices, automatic vehicle identification antennae, communications gear, and other necessary equipment. This equipment would be supported approximately 20 feet above the roadway surface and would be used to collect electronic toll data. The exact location of the proposed toll gantry locations would be determined during final design.

The ETC system minimizes the amount of ROW needed for the proposed toll collection facilities because additional lanes for cash toll booths and parking and other facilities for toll attendants would not be required. The gantry would also minimize the acceleration and deceleration of traffic that usually accompanies a toll collection location because cash would not be accepted. Also, last-minute lane changes between toll and cash lanes would not occur, providing smoother traffic conditions at the toll collection locations. Lighting impacts would be minimized because the gantries would not require any lighting beyond typical roadway-specific lighting for the video enforcement cameras.

TxDOT's objective is to establish interoperable statewide toll accounts. Any ETC account set up with a toll facility operator in Austin, Dallas, Houston, or other city would be able to access toll roads or managed lanes in any of the toll authority areas while having the tolls charged to the user's home account. To achieve this objective, toll tags or stickers issued by a toll authority in one area of the state would be capable of registering toll transactions to the user's home toll account. Users from other states or international drivers would be billed similarly to users without toll tags.

The Alamo RMA primary website will be available in English, Spanish and other languages via online based translation programs. Customer service will be offered in both Spanish and English.

Summary of the No-Build and Build Alternatives' Ability to Meet Project Need, Purpose and Objectives

Chapter 1 presented the need, purpose and objectives for improvements to the US 281 project corridor. **Table 2-5** provides a summary of how the Proposed Build Alternatives are able to meet the need, purpose and objectives, compared to the No-Build Alternative. More information about specific issues and impacts related to the alternatives can be found in Chapter 3.



Table 2-5: Ability of the Alternatives to Meet the Project's Need, Purpose and Objectives

Project Need/Purpose and Objectives	Alternative		
	No-Build	Expressway	Elevated Expressway
Project Need/Purpose			
Address Growth by improving Mobility and Accessibility	NO No additional capacity	YES Additional vehicle lanes and grade-separated interchanges plus transit, bicycle and pedestrian facilities	
Address Functionality	NO Through traffic shares the same lanes as turning traffic	YES Traffic is separated: through traffic is on main lanes, turning traffic uses frontage roads	
Enhance Safety	NO Many conflict points with driveways and streets opening directly onto US 281	YES Driveways and streets connect to frontage roads, which connect to main lanes via on and off ramps	
Improve Community Quality of Life	NO Air quality, noise, visual setting, and lack of transportation choices continue to detract from quality of life	YES Improved air quality, noise abatement, aesthetic treatments and landscaping, transit, bicycle and pedestrian facilities	
Project Objectives			
Satisfy Travel Demand	NO High level of congestion during peak travel times; 100 percent of project corridor main lanes at LOS E or F by 2035	YES Reduced congestion during peak travel times; 75-80 percent of project corridor main lanes at LOS D or better by 2035	
Be Consistent with Local and Regional Plans and Policies	NO Inconsistent with SA-BC MPO's <i>Mobility 2035</i> long-range transportation plan	YES Consistent with current <i>Mobility 2035</i> long-range transportation plan	NO Provides fewer main lanes in some locations than <i>Mobility 2035</i> long-range transportation plan


Table 2-5: Ability of the Alternatives to Meet the Project's Need, Purpose and Objectives

Project Need/Purpose and Objectives	Alternative		
	No-Build	Expressway	Elevated Expressway
Develop Facilities for Multi-Modal Transportation	NO No transit, bicycle or pedestrian facilities	YES Provides for transit park and ride, continuous bike and pedestrian facilities on both sides of project corridor, potential for future transit capacity	
Allow for Future High Capacity Transit	YES Existing right-of-way could accommodate future capacity improvements	YES Includes space within proposed right-of-way for potential future capacity improvements, such as high capacity transit	
Reduce Travel Time and Increase Travel Speeds	NO Average travel time in 2035 would be longer than today, with <i>peak hour</i> main lane speed only about 10 mph	YES Average travel time in 2035 would be shorter than today, with <i>peak hour</i> main lane speed ranging from 34 to 49 mph	
Reduce Conflicts Between Local and Through Traffic	NO No additional grade-separations or frontage roads	YES Main lanes overpass cross streets allowing continuous flow for through traffic; frontage roads allow for local traffic to access streets and driveways	
Improve Access to Adjacent Property	NO Access impeded by gradually worsening congestion	YES Continuous one-way frontage roads allow for direct access to cross streets and driveways	YES Existing US 281 lanes serve as frontage roads, supplemented by short sections of two-way access roads
Reduce Crash Rates	NO Driveways and streets still open directly onto US 281 posing traffic conflicts	YES Main lanes and cross-streets are grade-separated, lower speed frontage roads provide safe access to streets and driveways	
Avoid/Minimize Adverse Social and Economic Impacts	YES No residential or commercial displacements	YES Residential and commercial displacements minimized; mitigation to be provided	

**Table 2-5: Ability of the Alternatives to Meet the Project's Need, Purpose and Objectives**

Project Need/Purpose and Objectives	Alternative		
	No-Build	Expressway	Elevated Expressway
Avoid/Minimize Water Quality Impacts	NO Does not meet TCEQ standards for water pollution abatement	YES Designed to meet TCEQ Edwards Aquifer Rules	
Avoid/Minimize Impacts to Wildlife Habitat	YES No additional right-of-way required	YES Threatened and endangered species not found within right-of-way to be acquired.	
Enhance Air Quality	NO Increase in vehicle emissions due to worsening congestion	YES Decrease in vehicle emissions through improved mobility	
Minimize Noise Impacts	NO No noise abatement measures	YES Includes noise abatement	
Maximize Use of Non-Toll Funds	NO Does not require major capital investment	YES Funds from non-toll sources have been identified by the SA-BC MPO to help pay for proposed improvements	
Provide for Aesthetics and Landscaping	NO Corridor remains in existing condition	YES Includes context sensitive solutions and low impact development approaches	
Provide Facilities for Walking and Biking	NO No facilities	YES Continuous pedestrian and bicycle facilities on both sides of the roadway	

Source: US 281 EIS Team, 2012

2.4.3 Project Cost Estimates

Preliminary cost estimates for the Proposed Build Alternatives are calculated in 2010-2011 dollars and include the following elements:

- construction (excavation, embankment, pavement, retaining walls, structures, and drainage)
- construction engineering
- signing, striping, barricades, signs, and traffic handling
- environmental analysis



- 1 • environmental mitigation
- 2 • ROW acquisition
- 3 • mitigation of hazardous materials sites
- 4 • design including preliminary engineering
- 5 • utility relocations
- 6 • miscellaneous costs (including supplemental work, bond options, contingencies)

No lifecycle maintenance, operations, or yearly cost escalation was estimated for the alternatives. The ROW acquisition cost estimates are based on the 2010 appraised values of properties along US 281 as determined by the Bexar Appraisal District. As property values are adjusted on an annual basis, the costs associated with ROW acquisition will subsequently change with future market conditions and land values. Construction costs are based on data from TxDOT's Statewide Construction Average Low Bid Unit Price as compiled from August 2010 to July 2011. Engineering costs were estimated at seven percent of the total construction costs. Given the preliminary stage of design, various contingencies were built into the cost estimate for each alternative. **Table 2-6** highlights the estimated costs of each Proposed Build Alternative as of August 2011. Detailed information about the cost estimates is included in **Appendix K2**.

Table 2-6: Cost Estimates

Cost Component	Unit	Alternative and Funding Option						
		No-Build	Expressway			Elevated Expressway		
			Non-Toll	Toll	Managed	Non-Toll	Toll	Managed
Cost (Millions)								
Construction Estimate	2010/2011 Dollars	N/A	\$ 376.9	\$ 389.8	\$ 389.8	\$ 581.6	\$ 589.9	\$ 589.9
ROW Estimate	2010 Dollars		\$ 30.7	\$ 30.7	\$ 30.7	\$ 23.9	\$ 23.9	\$ 23.9
Engineering/ Professional Services Estimate	2010/2011 Dollars		\$ 26.4	\$ 27.5	\$ 27.5	\$ 40.7	\$ 41.4	\$ 41.4
Total Cost Estimate	2010/2011 Dollars		\$ 434.0	\$ 448.0	\$ 448.0	\$ 646.2	\$ 655.2	\$ 655.2

Source: TxDOT, 2011a, US 281 EIS Team, 2011